BULLETIN OF THE

TAYLOR SOCIETY

A SOCIETY TO PROMOTE THE SCIENCE AND THE
ART OF ADMINISTRATION AND OF MANAGEMENT

IN THIS ISSUE

Machine-Posted Stores Records

Methods of Compensating Salesmen

Man Management: A New Profession

Unemployment Scores

How an Unstabilized Dollar Interferes with
Efficient Management

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AUGUST, 1921 VOL. VI., No. 4

TAYLOR SOCIETY

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OBJECTS OF THE SOCIETY

(Extract from the Constitution)

The objects of this Society are, through research, discussion, publication and other appropriate means:

1. To secure an understanding and intelligent direction of the principles governing organized effort for the accomplishment of industrial and other social purposes for the mutual benefit of

A. The Community
B. Labor
C. The Manager
D. The Employer

2. To secure the gradual elimination of unnecessary effort and of unduly burdensome toil in the accomplishment of the work of the world.

3. To promote the scientific study and teaching of the principles governing organized effort, and of the mechanisms of their adaptation and application under varying and changing conditions.

4. To promote general recognition of the fact that the evaluation and application of these principles and mechanisms are the mutual concern of the community, labor, the manager and the employer.

5. To inspire in labor, manager and employer a constant adherence to the highest ethical conception of their individual and collective social responsibility.

SEP 24 1921

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TAYLOR SOCIETY

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COMMENT

WITH the development of local sections of the Taylor Society has appeared a new problem—how to publish the abundance of material now available for the BULLETIN. Formerly the proceedings of the national meetings, supplemented by an occasional special article, provided just enough for six issues each year. The local section meetings have doubled the available first-class material. The Society is confronted by a real problem which should be considered—and solved—at the annual business meeting in December. There is now material for twelve issues a year. But twelve issues of a well-printed bulletin which carries no advertising is an expensive item. What is the solution?

THERE is an argument other than mere abundance of material for more frequent issues. The Society is growing—January, 1919, 136 members; January, 1920, 243 members; January, 1921; 444 members; August, 1921, 654 members. Growth means diversity of primary interests. It is assumed that all serious students of administration and management are interested in all phases of management, but each has a primary interest. The administrator of large affairs, the general manager of operations, the shop superintendent, the treasurer, the sales manager, the foreman, the balance of stores clerk—each has his special interest. The programs of meetings are planned to provide for all of these interests. Members would like to see the BULLETIN also provide for the same variety of interests. One does not get enough from hearing a technical paper; one wants to read and study it. The opportunity should be afforded. More issues or larger issues are the only ways out, and both amount to the same thing in cost.

MAKE a tickler memorandum—the next meeting of the Society will be held Dec. 1, 2 and 3, in the Engineering Societies Building, New York. It is at the December meeting that the annual business meeting is held, therefore no member should fail to be present. Plans for the program are well along and will be announced in detail soon. We can say now that there will be a session for shop managers, one for sales managers, one for personnel managers, one for office managers, one for treasurer-comptrollers, and a general session for proprietors and administrators. At the sales managers' session discussion will take place, more intensive than a year ago, on sales engineering, or merchandising, and on sales operating, or sales production. For the office managers' session a paper is being prepared giving actual results in the application of scientific management to three types of offices particularly—banks, the general offices of department stores and the general offices of manufacturing plants. A committee is at work on the preparation of a report on the application of scientific management principles to the work of the treasurer and comptroller, for the treasurer-comptroller session. Altogether, we believe the meeting will be well worth while.

EVERY subject discussed in this issue is pertinent to scientific management. We have not seen in a long time a better technical paper than Mr. Ford's. The article by Mr. Woodbridge lays the ground for further intensive study of the problem of compensation. Meyer Bloomfield's article is particularly timely —it is the responsibility of scientific management particularly to carry forward the torch of idealism for better industrial relations in these times when throughout industry there is a marked decline in practical measures looking towards better relations with workers. Mr. Cooke's article indicates a new and necessary method of measuring the efficiency of management. And are there still engineers and executives who wonder what the financial system has to do with good management? Is it possible that there are those who still fail to see that the kind of dollar we have is a practical question of management—in these times when executives are having little to manage and engineers few plants in which to develop better methods, because, in part, of havoc created by the influence of a wabbling dollar on prices?

THE following letter from Mr. W. W. Norton will be appreciated by members who are graduates of engineering schools. Fully half of the graduates of these schools become executives in industry and do not pursue the strictly professional work for which they have been narrowly and intensively trained. And those who remain professional engineers find that many of their problems are problems of administration and management. Yet the faculties of these schools persist in their refusal to afford the student opportunity for the study of business administration. Why do not the alumni of each engineering school who have had the same experience as Mr. Norton and who have the same point of view, organize to bring pressure to bear upon the faculty of their school for the purpose of securing such a curriculum as their experience proves is desirable?

To the Editor of the Bulletin:
Dear Sir:

Some years ago I approached the Dean of the engineering school of one of the largest western universities with the request that I be permitted to take a course or two in the Economics Department of the college of arts. The Dean reminded me that I was a candidate for a degree in mechanical engineering and refused my request. However, I managed to take the courses in question without his knowledge and, of course, without credit. Subsequently, when I told the Dean what I had done his only comment was to express his indignation at the professors who had permitted me to take my time away from the prescribed engineering subjects. (Although this university now has a school of commerce with a number of excellent courses in business administration, industrial management, etc., I understand these courses are still "taboo" to students in the engineering school).

During the past year I have had these conditions confirmed as the lot of perhaps a half dozen engineers with whom I have discussed the matter. They have uniformly bewailed the lack of training, aside from the technical courses, received at their respective alma maters.

To be sure, in a few institutions a start has been made. The Massachusetts Institute of Technology now offers a course in engineering administration with the same status as their regular engineering courses. Students of their regular engineering courses, however, do not connect with any of the subjects given in these courses. At the University of Wisconsin, where an experienced engineer is giving a number of courses in labor management, with particular reference to the various plans that have been worked out for shop committees, and other methods of employee representation, these courses are "available" to regular engineering students as electives in their Junior year.

But nowhere, so far as I can learn, unless it is to be at Antioch, are courses dealing with the human factors in industry made a part of the engineering curriculum. Men are graduated each year, well trained to meet all of their mechanical problems, but without an idea in their heads about the broader social and economic problems with which they are likely to be confronted. Institutes take the greatest care in training men to handle materials in the most scientific way, without any consideration whatsoever being given to the study of the handling of the men who will work these materials.

As a matter of fact, in a survey which I have just made I find that at only two of twelve leading engineering schools in the country is it possible for regular engineering students to take any courses in the field of industrial relations. And with respect to the exceptions mentioned, I am informed that the initiative making possible these electives came entirely from outside the engineering faculties.

Members of the Taylor Society more than any other group in the country should feel the responsibility of arousing the engineering faculties to this situation. It seems to me that we should be able to bring such pressure to bear upon these faculties as to make them recognize the need for providing as a regular part of their curriculum, courses covering a thorough-going study of the principles of economics, courses in the management of industrial enterprise (including the study of the science of management, as presented by Taylor, Gantt and others, with the idea of inspiring in the student the same scientific approach to these problems that he is taught in his engineering work), courses devoted to labor problems, with a brief study of the labor movement, trade unionism, shop committees, arbitration courts, wage payments and the psychology of the worker.

In an industrial age such as ours, the future is to the class of society actually in charge of the industrial processes—the engineers. Upon the degree then to which our colleges turn out engineers trained to have some regard for social functions of their work will human progress largely depend.

Very truly yours,
W. W. Norton.

MACHINE-POSTED BALANCE OF STORES RECORDS[1]

By C. Moffitt Ford[2]

I. REASONS AND ADVANTAGES

A. REASONS FOR MACHINE POSTING

BEFORE considering the question of what machine posting of stores records is, or how it can be accomplished, the very insistent and fundamental question arises: *Why* is machine posting?

The first reason for machine posting is *accuracy*.

The second reason is *speed*, greater speed in posting than can be realized by hand when the same amount of information is shown in either case.

The third reason is *legibility*.

There is another question, too, that always comes up; speed and legibility may be conceded, but why should machine posting be any more *accurate* than hand posting? Partly because the machine is largely automatic in its operations, while the human hand and brain are not; partly because, being automatic, machine work is less fatiguing to the operator. But these are only contributory features. They merely *reduce* the frequency of machine mistakes over hand mistakes; they do not eliminate them. The feature that corrects mistakes once made, that eliminates error in the final results, is the positive *mechanical proof* which is a part of machine methods, but which is impossible by hand. Practically the entire theory of machine posting revolves around the mechanical proof. If accuracy in any proposed installation is not important enough to justify the expense of a full and positive proof, it is not important enough to bother with a mechanical installation.

But there is a great difference in efficiency among the various machine systems themselves; for the development of machine posting is really in its infancy. Some applications are simpler, more rapid, more nearly automatic, more readily readable, and, above all, capable of a more positive proof than others. It is such an application that we believe we have developed in the Eaton, Crane & Pike Company of Pittsfield, Massachusetts, and that I shall endeavor to explain to you tonight.

B. ADVANTAGES OF SPECIFIC PLAN HEREIN PRESENTED

To be somewhat more explicit, the features wherein we consider our own mechanical application superior to any other machine-posting plan of which we are aware are principally these:

1. It is *automatic* to the extent that no other plan is. It is not only *relatively* automatic but almost absolutely so. The operations of selecting the posting columns, determining whether the postings therein are plus or minus, making the calculations, and finally printing the results, are all completely automatic. The only part of the posting process in fact which is not automatic is transcribing the amounts from the posting media to the keys of the machine. The direct results of these automatic features are, of course, greater speed, less mental strain and fatigue, and therefore fewer mistakes to correct in the proving process.

2. It incorporates a *proof* which has been described without much exaggeration as error proof, water proof, hole proof and fool proof. This proof consists of an entirely new method of *double* verification; viz., the customary "old-and-new-balance" proof and in addition a cross footing proof, the combination of which readily discloses any possible kind of error that could be made in the posting process.

3. It *eliminates repetition* of date and distinguishing symbol or order number in any single posting. These designations according to our method are required to be posted once only for each transaction as against twice by either the hand method, or by the usual machine method. This simplification is accom-

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[1] A paper presented before the Philadelphia Section of the Taylor Society.

[2] Superintendent of Stores, Eaton, Crane & Pike Co., Pittsfield, Mass.

plished by employing a design which will be referred to later in this description as the "Unit Line Feature."

4. It affords *superior readability* of card records; and by this is not meant merely the greater legibility of printed over hand-written figures. By segregating the *balance* columns in a separate field from the posting or *transactions* columns, and by incorporating the "Unit Line Features," just referred to, the Ledger Card can be read understandingly and with ease by a person entirely unfamiliar with Balance of Stores records.

5. It *eliminates* all *proof* or *"pick-up"* columns. I am well aware that the pick-up column is the pet idol of the posting machine companies, and the one, apparently, that has them thoroughly scared, too, since none of them have dared to break away from it. We have proved it to be, however, like that famous one of Kipling's, nothing but a "bloomin' idol made o' mud." I am convinced that the pick-up column not only is unnecessary, but that it provokes the very mistakes that it was provided to trace. This is a point that will be explained more fully later in this description.

The foregoing brief summary of the special advantages we are deriving from our particular installation, logically brings us to a consideration of the *mechanical equipment* and the *card design* with which these results are obtained.

II. MECHANICAL EQUIPMENT AND CARD DESIGN

A. MECHANICAL EQUIPMENT

1. The machines employed by us for handling our Balance of Stores posting are the Burroughs Posting Machines, Style 676-C, costing approximately $1000 each.

2. In addition to the regular posting machines we employ a hand-operated Burroughs Listing Machine, Style 314, costing $275, to be used with each of the posting machines for the purpose of taking predetermined totals and cross footings.

Note: While the experiments which Elliott-Fisher machine people are conducting with our style of card are not yet complete, I may state from the latest information I now have as to their progress, that I believe their machine could be employed with our card with only a slight and unimportant alteration of the copy. Each machine has its advantage. The advantage of the Burroughs is that it is more nearly automatic, in that it *prints* the results of all calculations, while the Elliott-Fisher merely *indicates* such results on a dial or counter for the operator to copy as in typewriting. The advantage of the Elliott-Fisher is that it is capable of typewriting letters as well as figures, and where it is desirable to incorporate the writing of words, sentences or mnemonic symbols in the posting, this advantage may be considered a very important one, as it would necessarily confine the choice of equipment to a machine of the typewriter variety, such as the Elliott-Fisher, or perhaps the Underwood or the Rem-Wahl. The capacity in this respect of the Burroughs model which is employed in our own installation, is the *printed month and day, four-code numbers,* and the *choice* of any one of *nine letters.* In the matter of proof methods, one machine is about as convenient as the other and, according to my present information, both are equally positive. The principal difference, which is one of form only, is in the old-and-new-balance proof. The Elliott-Fisher machine accumulates the footing of the new balance instead; the difference between this footing and a predetermined total of the old balance should equal the predetermined total of the posting media.

It should be mentioned here, however, that the references in this paper to posting the card, and adjusting and operating the machine, relate to the Burroughs installation.

B. CARD DESIGN

1. *The Base.* It is a well accepted principle of scientific management that the essential points of information concerning any item of stores which are required to give the complete status of the stores are as follows:

Balance on Order.
Balance on Hand.
Balance Apportioned.
Balance Available.

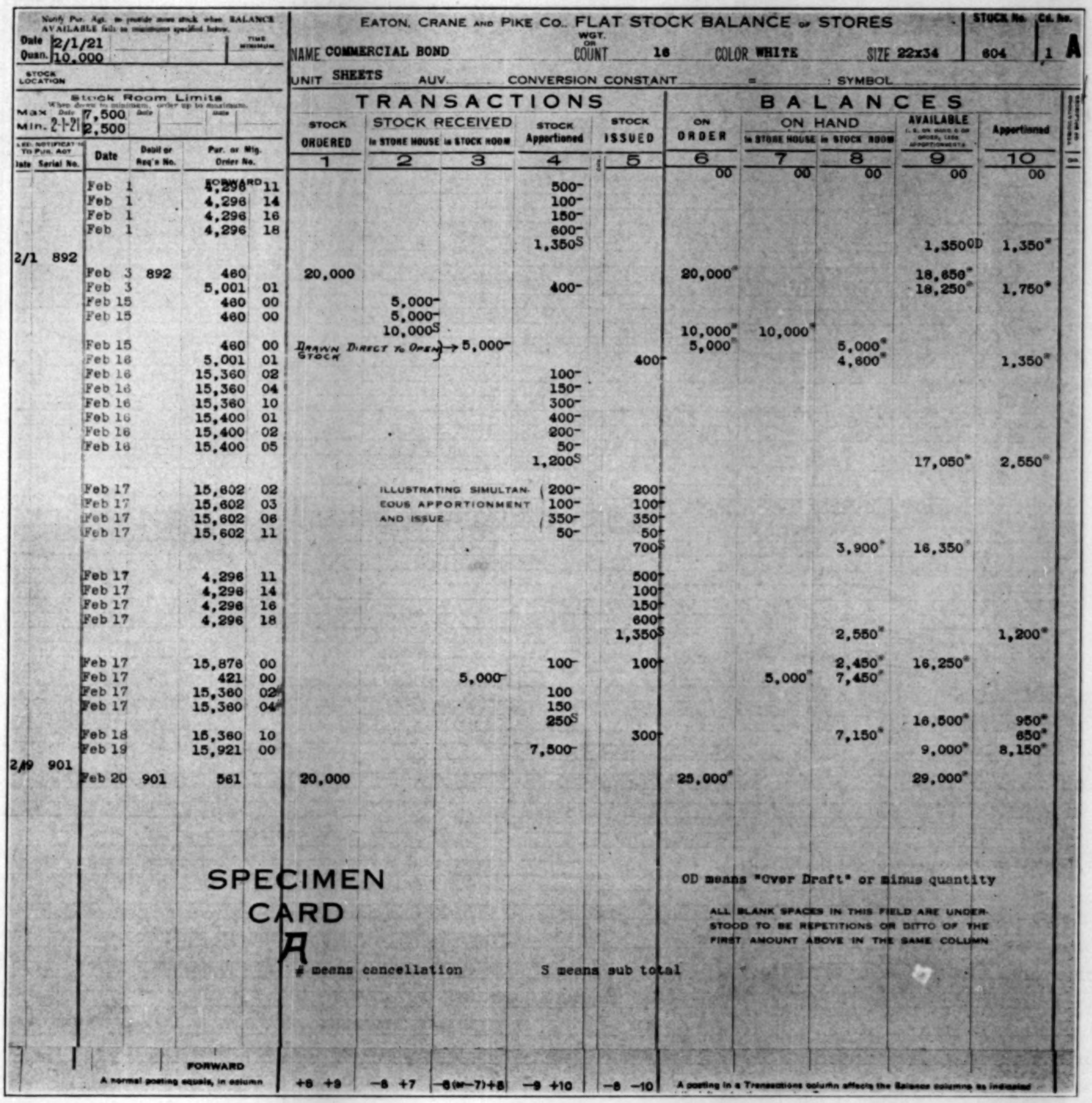
These particulars constitute what may be termed Base Requirements, and the card which we employ was designed on this base. The "complete lots" column often shown on standard Balance of Store sheets is merely a subdivision of the Balance on Hand, just as in our case the amount shown "In Storehouse" is a similar subdivision of the same balance. But these are merely variations of form; the base itself is not changed. For the sake of simplicity and clearness, this description will be confined, so far as possible, to the base card of four balance columns instead of to our own particular variation of five balance columns.

2. *Distinctive Features.* The particularly distinctive features of the card under discussion are:

a. Separation of the *transactions* or *posting* field from the *balance* field;
b. The *unit line* feature;
c. The peculiar mechanical result obtained by the combination of these two features;
d. The supplementary pencil columns.

These features will be described in detail in the order mentioned above.

a. Separation of the transactions or posting field from the balance field. Because of this feature all of the balances appear in a field by themselves and con-



Notify Pur. Agt. to provide more stock when BALANCE AVAILABLE falls to minimum specified below.
Date 2/1/21
Quan. 10,000
TIME MINIMUM

STOCK LOCATION

Stock Room Limits
When down to minimum, order up to maximum.
Max Date 7,500 Date Date
Min. 2-1-21 2,500

EATON, CRANE AND PIKE CO. FLAT STOCK BALANCE OF STORES
STOCK No. 604 Cd. No. 1 A
NAME COMMERCIAL BOND WGT. OR COUNT 16 COLOR WHITE SIZE 22x34
UNIT SHEETS AUV. CONVERSION CONSTANT = : SYMBOL

REC. NOTIFICATION TO PUR. AGT. Date	Serial No.	Date	Debit or Req's No.	Pur. or Mfg. Order No.		TRANSACTIONS: STOCK ORDERED 1	STOCK RECEIVED In STORE HOUSE 2	STOCK RECEIVED In STOCK ROOM 3	STOCK Apportioned 4	STOCK ISSUED 5	BALANCES: ON ORDER 6	ON HAND In STORE HOUSE 7	ON HAND In STOCK ROOM 8	AVAILABLE 9	Apportioned 10
											00	00	00	00	00
		Feb 1		FORWARD 4,296	11				500-						
		Feb 1		4,296	14				100-						
		Feb 1		4,296	16				150-						
		Feb 1		4,296	18				600-						
									1,350S					1,350OD	1,350*
2/1	892														
		Feb 3	892	460		20,000					20,000*			18,650*	
		Feb 3		5,001	01				400-					18,250*	1,750*
		Feb 15		460	00		5,000-								
		Feb 15		460	00		5,000-								
							10,000S				10,000*	10,000*			
		Feb 15		460	00	DRAWN DIRECT TO OPEN STOCK →		5,000-			5,000*		5,000*		
		Feb 16		5,001	01					400+			4,600*		1,350*
		Feb 16		15,360	02				100-						
		Feb 16		15,360	04				150-						
		Feb 16		15,360	10				300-						
		Feb 16		15,400	01				400-						
		Feb 16		15,400	02				200-						
		Feb 16		15,400	05				50-						
									1,200S					17,050*	2,550*
		Feb 17		15,602	02		ILLUSTRATING SIMULTANEOUS APPORTIONMENT AND ISSUE		200-	200+					
		Feb 17		15,602	03				100-	100+					
		Feb 17		15,602	06				350-	350+					
		Feb 17		15,602	11				50-	50+					
										700S			3,900*	16,350*	
		Feb 17		4,296	11					500+					
		Feb 17		4,296	14					100+					
		Feb 17		4,296	16					150+					
		Feb 17		4,296	18					600+					
										1,350S			2,550*		1,200*
		Feb 17		15,876	00				100-	100+			2,450*	16,250*	
		Feb 17		421	00			5,000-				5,000*	7,450*		
		Feb 17		15,360	02#				100						
		Feb 17		15,360	04#				150						
									250S					16,500*	950*
		Feb 18		15,360	10					300+			7,150*		650*
		Feb 19		15,921	00				7,500-					9,000*	8,150*
2/19	901														
		Feb 20	901	561		20,000					25,000*			29,000*	
				FORWARD											
		A normal posting equals, in column				+6 +9	−6 +7	−6 (or −7) +8	−9 +10	−8 −10	A posting in a Transactions column affects the Balance columns as indicated				

SPECIMEN CARD
A

means cancellation

S means sub total

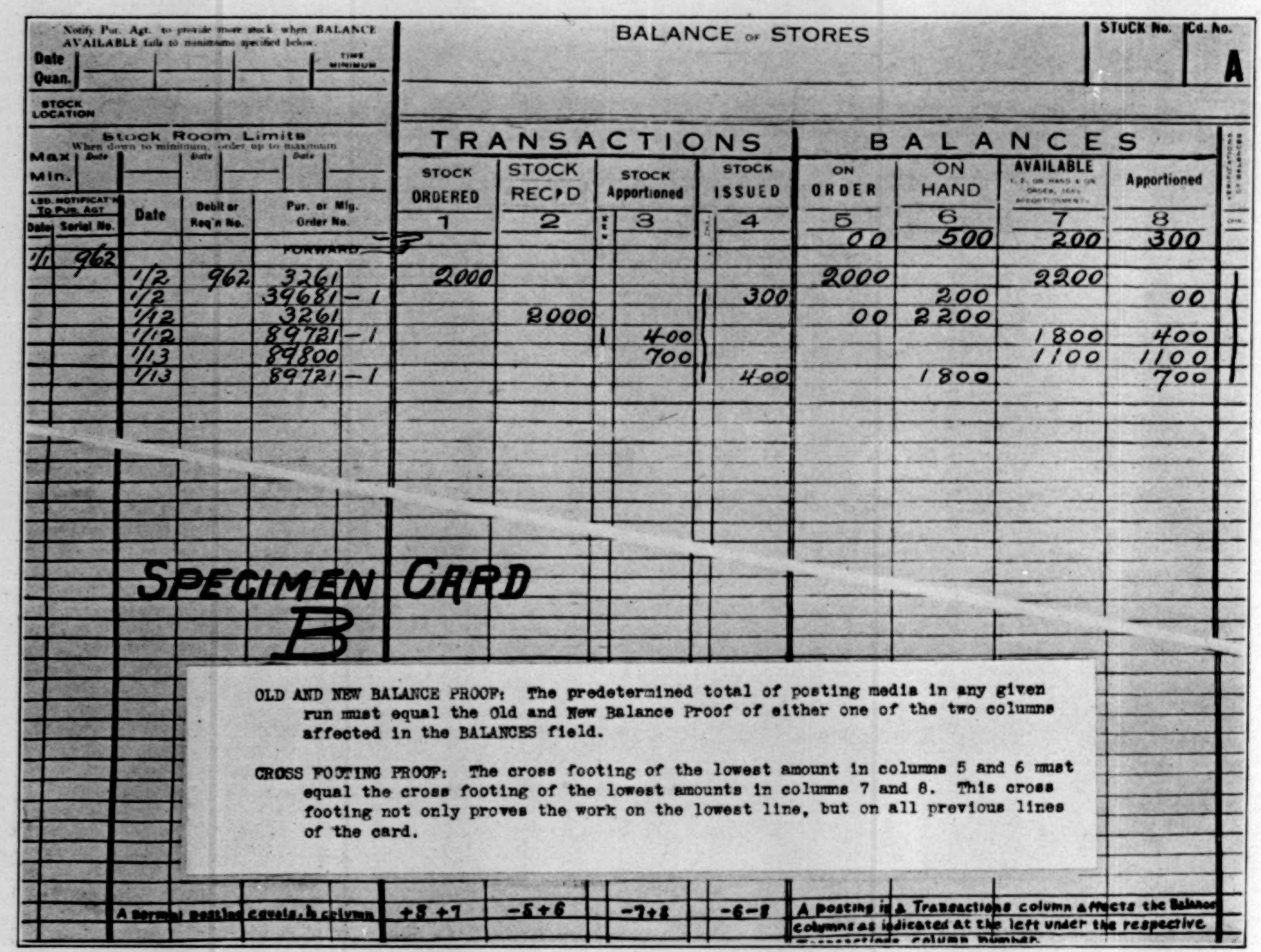
OD means "Over Draft" or minus quantity

ALL BLANK SPACES IN THIS FIELD ARE UNDERSTOOD TO BE REPETITIONS OR DITTO OF THE FIRST AMOUNT ABOVE IN THE SAME COLUMN

Figure 1

sequently the complete list of essential particulars regarding the status of any item, viz., the balance *on order, on hand, apportioned* and *available* are readily seen at a glance. No skipping from one section of a card to another to obtain these balances is required. This is particularly convenient when making up extensive reports from ledger cards. Comptometer operators or clerks entirely unfamiliar with ledger cards can take these cards and draw therefrom any designated particulars practically as readily as regular ledger clerks. This makes it possible to split any given ledger up into as many sections as there are comptometer operators or other clerks available, and draw a complete ledger report in a surprisingly small amount of time. In our own experience we have on occasion drawn an inventory of an entire division of the ledger, consisting of around 600 cards, in approximately one hour by splitting the ledger into seven or eight sections.

b. The unit line feature. This feature provides that the complete status of stock on any given date



Notify Pur. Agt. to provide more stock when BALANCE AVAILABLE falls to minimums specified below.

Date
Quan.
TIME MINIMUM

STOCK LOCATION

Stock Room Limits
When down to minimum, order up to maximum

Max
Min.
Date

BALANCE OF STORES

STOCK No.
Cd. No. A

LDG. NOTIFICAT'N TO PUR. AGT Date	Serial No.	Date	Debit or Req'n No.	Pur. or Mfg. Order No.		TRANSACTIONS STOCK ORDERED 1	STOCK REC'D 2	STOCK Apportioned 3	STOCK ISSUED 4	BALANCES ON ORDER 5	ON HAND 6	AVAILABLE 7	Apportioned 8
1/1	962			FORWARD						00	500	200	300
		1/2	962	3261		2000				2000		2200	
		1/2		39681	-1				300		200		00
		1/12		3261			2000			00	2200		
		1/12		89721	-1			400				1800	400
		1/13		89800				700				1100	1100
		1/13		89721	-1				400		1800		700

SPECIMEN CARD B

OLD AND NEW BALANCE PROOF: The predetermined total of posting media in any given run must equal the Old and New Balance Proof of either one of the two columns affected in the BALANCES field.

CROSS FOOTING PROOF: The cross footing of the lowest amount in columns 5 and 6 must equal the cross footing of the lowest amounts in columns 7 and 8. This cross footing not only proves the work on the lowest line, but on all previous lines of the card.

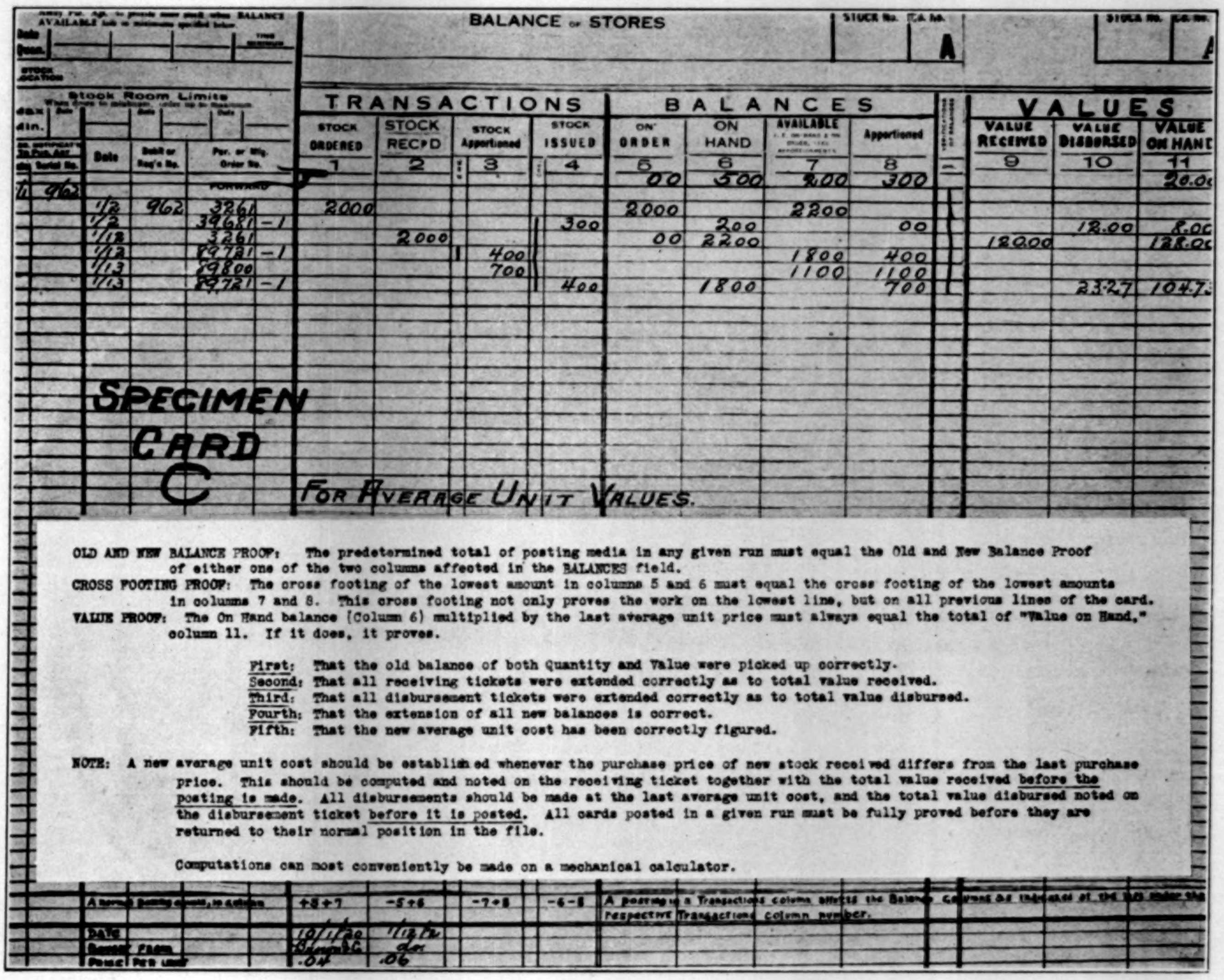
A normal posting equals, in column	+5 +7	-5+6	-7+8	-6-8	A posting in a Transactions column affects the Balance columns as indicated at the left under the respective transactions column number.

Figure 2

can be read by following *one line straight across the card.* It also renders unnecessary the repetition of date and distinguishing order or symbol numbers. When reading the *balance* field all blank spaces therein are simply to be regarded as a repetition or ditto of the first number above appearing in that column. The unit line feature renders it easy, not only to read the status, including the individual transaction or posting against the latest date, but also renders it equally easy to read the status against any *past* date, something which is often quite difficult on the old style Balance of Stores sheets. On the cards herein described the status on past dates can be read by simply selecting the date in the single date column against which the status of stock is desired, then reading all particulars on the *same* line to the right all the way across the card.

c. The mechanical result of the combination of the two features just described. This combination makes it possible to utilize the mechanism of the Burroughs machine in posting (and to a certain degree this would be true of the Elliott-Fisher machine) in a way that the old forms of machine-posted cards, actually designed for these machines, do not It is the feature that makes the posting operation so nearly completely automatic, and that makes possible our unusually positive method of proof.

(1) Inasmuch as the posting in any given column in the *transactions field* always affects certain respective columns in the *balance field,* and inasmuch as all these transactions and their corresponding balances are on the *same line,* stop bars and control bars can be set up in advance for all kinds of postings which are possible to the card. Then by classifying the postings into runs of the same variety—i. e., groups of all *apportionments* or all *issues,* etc., to be posted as *single* runs, not alternated with postings of different classes —all that is required is to insert the stop and control bar of the number corresponding to the column number in which the class of postings to be run would fall, and the machine will automatically stop the car-



BALANCE OF STORES

A

						TRANSACTIONS				BALANCES					VALUES		
	Date	Debit or Req'n No.	Pur. or Mfg. Order No.		STOCK ORDERED 1	STOCK REC'D 2	STOCK Apportioned 3	STOCK ISSUED 4	ON ORDER 5	ON HAND 6	AVAILABLE 7	Apportioned 8	—	VALUE RECEIVED 9	VALUE DISBURSED 10	VALUE ON HAND 11
962			FORWARD						00	500	200	300				20.00
	1/2	962	3261		2000				2000		2200					
	1/2		39681	-1				300		200		00			12.00	8.00
	1/12		3261			2000			00	2200				120.00		128.00
	1/12		89781	-1			400				1800	400				
	1/13		89800				700				1100	1100				
	1/13		89721	-1				400		1800		700			23.27	104.7

SPECIMEN CARD C

FOR AVERAGE UNIT VALUES.

OLD AND NEW BALANCE PROOF: The predetermined total of posting media in any given run must equal the Old and New Balance Proof of either one of the two columns affected in the BALANCES field.

CROSS FOOTING PROOF: The cross footing of the lowest amount in columns 5 and 6 must equal the cross footing of the lowest amounts in columns 7 and 8. This cross footing not only proves the work on the lowest line, but on all previous lines of the card.

VALUE PROOF: The On Hand balance (Column 6) multiplied by the last average unit price must always equal the total of "Value on Hand," column 11. If it does, it proves.

First: That the old balance of both Quantity and Value were picked up correctly.
Second: That all receiving tickets were extended correctly as to total value received.
Third: That all disbursement tickets were extended correctly as to total value disbursed.
Fourth: That the extension of all new balances is correct.
Fifth: That the new average unit cost has been correctly figured.

NOTE: A new average unit cost should be established whenever the purchase price of new stock received differs from the last purchase price. This should be computed and noted on the receiving ticket together with the total value received before the posting is made. All disbursements should be made at the last average unit cost, and the total value disbursed noted on the disbursement ticket before it is posted. All cards posted in a given run must be fully proved before they are returned to their normal position in the file.

Computations can most conveniently be made on a mechanical calculator.

A normal posting affects, in columns	+5+7	-5+6	-7+8	-6-8	A posting in a Transactions column affects the Balance Columns as indicated at the foot under the respective Transactions column number.
DATE	10/1/20	1/12/2			
BOUGHT FROM		do			
PRICE PER UNIT	.04	.06			

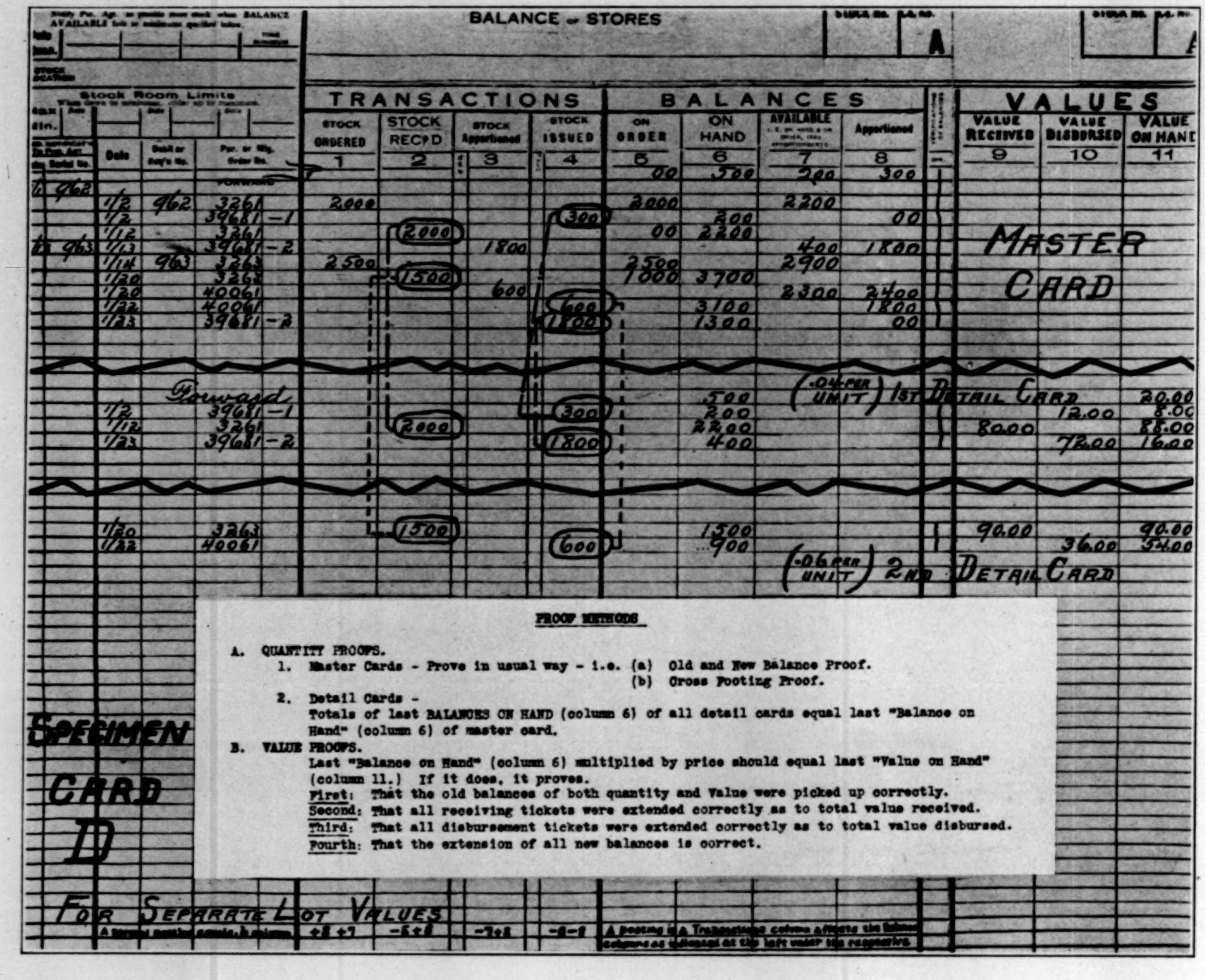
Figure 3

riage only at the columns in both the *transactions* and the *balances* field, which are fixed by this class of postings. This set-up will also cause the machine to operate in the subtract or in the add position in the *balance field,* depending upon the nature of the posting appearing in the *transactions* field.

For example: Suppose that a run of apportionments were being started. Stop and control bars No. 3, corresponding with column 3 on the card, would be inserted in the machine. The carriage would then automatically stop in consecutive order at *date, order number, stock apportioned* (column 3), *balance available* (column 7), and *balance apportioned* (column 8). (See Fig. 2-Card B.). The control bar would cause the machine to subtract the amount of the posting from the old balance in column 7 and to add to the old balance in column 8, all this without the necessity of the operator coming to a mental decision as to what columns were affected, or as to whether the operation were a plus or a minus one. In addition, the machine makes the actual calculation and prints the result. (That is, the Burroughs Machine will do this. With an Elliott-Fisher installation, as stated before, the operator would be obliged to print the figures manually as in typewriting, taking his reading from a visible dial on the machine.)

Note 1: At the foot of each card it will be noted that the key to the columns affected by each operation is printed in detail. Thus a normal posting in column 1 adds to columns 5 and 7, etc. Stop and control bars for each column are provided in advance and are carried in a compact wooden cabinet, with numbered pigeon holes, suspended vertically from the frame at the right side of the machine. The changing of these bars is a matter of fifteen to twenty seconds. While the changing of the bars is a very short operation, we find it an economy of time to post on one class of postings as long as possible, thus keeping the operation of changing stop bars, and more particularly the changing of classes of posting on the part of the operator, down to a minimum.

Note 2: Perhaps the arrangement of columns 7 and 8 on


BALANCE of STORES
A
Stock Room Limits
SPECIMEN CARD D
FOR SEPARATE LOT VALUES
MASTER CARD
(.04 PER UNIT) 1ST DETAIL CARD
(.06 PER UNIT) 2ND DETAIL CARD
+5 +7
-5 +6
-7 +8
-6 -8

	Date	Debit or Req'n No.	Pur. or Mfg. Order No.	TRANSACTIONS: Stock Ordered 1	Stock Rec'd 2	Stock Apportioned 3	Stock Issued 4	BALANCES: On Order 5	On Hand 6	Available 7	Apportioned 8	VALUES: Value Received 9	Value Disbursed 10	Value on Hand 11
962			FORWARD					00	500	200	300			
	1/2	962	3261	2000				2000		2200				
	1/2		39681-1				300		200		00			
	1/12		3261		2000			00	2200					
963	1/13		39681-2			1800				400	1800			
	1/14	963	3263	2500				2500		2900				
	1/20		3263		1500			1000	3700					
	1/20		40061			600				2300	2400			
	1/22		40061				600		3100		1800			
	1/23		39681-2				1800		1300		00			
			Forward						500					20.00
	1/2		39681-1				300		200				12.00	8.00
	1/12		3261		2000				2200			80.00		88.00
	1/23		39681-2				1800		400				72.00	16.00
	1/20		3263		1500				1500			90.00		90.00
	1/22		40061				600		900				36.00	54.00

PROOF METHODS

A. QUANTITY PROOFS.

1. Master Cards - Prove in usual way - i.e. (a) Old and New Balance Proof.
   (b) Cross Footing Proof.
2. Detail Cards -
   Totals of last BALANCES ON HAND (column 6) of all detail cards equal last "Balance on Hand" (column 6) of master card.

B. VALUE PROOFS.

Last "Balance on Hand" (column 6) multiplied by price should equal last "Value on Hand" (column 11.) If it does, it proves.

First: That the old balances of both quantity and Value were picked up correctly.
Second: That all receiving tickets were extended correctly as to total value received.
Third: That all disbursement tickets were extended correctly as to total value disbursed.
Fourth: That the extension of all new balances is correct.

Figure 4

card (Fig. 2—Card B.) will be questioned. Logically the *apportioned* column, No. 8, should appear before the *Available* column, No. 7. The position of these two columns was reversed purely for mechanical reasons which were peculiar to the Burroughs Machine.

Note 3: I would suggest the expression Balance *Provided For* as a preferable term to use instead of Balance *Available;* since the former is more nearly *descriptive* of the actual status of the stores so designated.

d. Supplementary Pencil Columns. The two columns at the extreme left of the card are intended for pencil or pen notation only. The check spaces in columns 3 and 4 are used respectively for checking off apportionments which have been assigned, and assignments which have been issued, the latter operation showing that stock which had been assigned and actually *left* the stock room. A complete physical inventory of stock on hand would therefore consist of the Balance in column 6 plus unchecked items in column four.

Note: In our own application, as before referred to, it was necessary to separate Stores on Hand into two parts, namely, the amount in the storehouse in cases and amount actually in the open stockroom. Columns 2 and 7 in our special card, therefore, are subdivisions of columns 2 and 6 respectively on the base card, and practically correspond to the "complete lots" column on the standard Balance of Stores sheet.

C. OPERATION

1. *The posting of the card* is accomplished as follows: First the date and all order numbers are recorded on the keys of the machine and the machine operated, i. e., caused to print. The date and order number columns are so arranged that, with a machine having nine numerals and date and "folio" field, one operation of the machine suffices to print both date and all order numbers at once. The carriage then automatically jumps to the column in the *transactions* field in which the posting is to appear. This posting is here put into the machine and the machine operated.

Carriage then jumps to the first of the two columns in the *balances field* to be effected. Note that up to this point the machine is not cleared; the original posting is still "in" the machine. Operator now throws the carriage back (i. e., tips it from him), and "picks up" the latest old balance in the column at which the carriage has stopped. This is printed "in the air," i. e., with the carriage back to avoid showing it on the card. Operator then returns carriage to printing position and clears the machine which prints the sum (or the difference) as a new balance. The carriage now automatically jumps to and stops at the second of the two balance columns affected. Inasmuch as the printing of the previous balance has "cleared" the machine, it is necessary to repeat the original posting as well as pick up the previous balance in order to get the sum or the difference to be printed as a new balance. In this operation both the original posting and the previous balance are printed "in the air," with the carriage back, so that only the actual balance shows in the balance column.

Note: It is this feature of printing certain amounts with the carriage back that the Burroughs Company was at first apprehensive might cause trouble. Our experience, however, has been exactly to the contrary, as will be described in detail in the discussion of Proof Methods which follows.

2. *Special Adjustments for Special Posting Processes.* As would no doubt occur in every installation, our own installation gave rise to a few special entries which required to be handled in a special way. By working out in advance the effect on the respective *balance* columns of a posting in any of the *transactions* columns, and then making up a separate set of stop and control bars for each kind of posting, the calculation and the entire posting operation, except merely operating the keys, can be left to the machine. We started out with five sets of bars, one for each column in the *transactions* field, but soon found, as no doubt would be the case in every individual installation, that our own installation called for certain special types of postings, and therefore certain special variations in control and stop bars. We simply determined what these special postings would be and made up stop and control bars accordingly. We now have seven or eight sets of stop bars for each machine.

As an illustration of this, some of our stores, after having been received, is ordered directly into open stock, i. e., into the stockroom without passing through the storehouse. We meet this condition by having a stop bar made up to stop at the date and order columns, and then at column 3, column 6 and column 8 (of Card A—see Fig. 1). The operation is to post the amount in column 3, subtract that amount from column 6 and add to column 8. Columns 2 and 7 are simply ignored in the operation.

Another special stop bar which we find of the greatest convenience is one which will permit both the *apportionment* and the *issue* of a quantity at the same time. This would occur on orders for immediate shipments for "shorts" on previous orders, and for requisitions which were presented for immediate filling. The bars to control this operation are as follows, with Card A. (Fig. 1). Carriage stops at usual date and order columns, then jumps to column 4 where the posting is put in as an *apportionment.* The repeat key, however, is depressed for this posting so that when the carriage jumps to column 5 the same *amount* is repeated in that column automatically without the operator touching the keys a second time. This avoids any possibility of repeating the posting incorrectly. Carriage then jumps to column 8 where the amount is deducted from the old balance and then to column 9 where a similar deduction is also made. Column 10 is not posted. The net result of the posting, however, is exactly the same as if a separate apportionment had first been put in as a posting to column 4, adding to column 10 and subtracting from column 9, and secondly, as an assignment in column 5, subtracting from column 8 and from column 10. This same set of stop bars is used for cancelling both an apportionment and an issue by simply holding the control lever to the add position when taking the balance so that the posting is exactly the reverse of the above, namely, an addition to column 8, and an addition to column 9. Our reason for repeating the original posting in both columns 4 and 5 is to pass absolutely all issues of stock through the "apportioned" as well as through the "issued" column. If it is desired to know the total apportionments at a certain date we must be able to depend upon the stock apportioned column to include every item which has passed over the ledger.

3. *Make up of Stop and Control Bars.* No general specifications as to the method of making up the stop bars and control bars for the various columns have been included in this description since any competent Burroughs service man will no doubt know exactly what is required when the operations are explained to him, and can make up the bars accordingly. One specific set-up, however, should be described, since the plan that we have adopted might not readily suggest itself to an adjuster who had not made a study of this particular problem.

In posting for assignments in the stock issued column, No. 5 of Card A (Fig. 1), it will be noted that the posting is a minus quantity in *both* of the balance columns. When a Burroughs machine is cleared, as on the completion of the balance in the first of the two balance columns, the setting of the machine automatically assumes the add or plus position. A posting, therefore, to the second balance column would be entered as a plus quantity unless special means were taken to prevent it. The posting could be entered as a minus quantity in column 10 by holding the hand control lever to the subtract position, and that is the way we started to handle postings of this class. But this introduces a *hand* operation, and therefore a mental decision which to that extent makes the operation non-automatic and subject to error. We have now the No. 5 bars made up as follows: Stop at column 5; Stop at column 8; Machine clears; Stop at column 9 where a special control block puts the machine in the minus position. While stopped at column 9 the posting—but not the old balance—is put into the machine "in the air." After the posting has been recorded on the machine, carriage jumps to column 10, once more assuming the plus position, in which position previous old balance is picked up. Machine is then operated and the result printed which will show the *difference* between the minus amount of the posting and the plus amount of the previous old balance, a result which is obtained by means of a strictly *automatic* operation all the way.

4. *Limits.* In our own application of this card a ledger clerk notifies the purchasing agent as soon as the balance available falls to a predetermined limit, writing by hand the notification blank number and date in the pencil column at the left of the card. The purchasing agent thereupon orders stock and sends his duplicate mail order to the ledgers where it is posted as "stock ordered" to the respective card.

A separate set of stockroom limits is also maintained on the ledger card, and when the balance on hand in the stockroom falls to the minimum, the stock is replenished to maximum. This operation is attended to automatically by a ledger clerk. This not only takes the responsibility away from the stockroom, but results in keeping a much more uniform stock on hand in the stock room for the reason that the stock room minimum will show on the ledger cards as having been reached before this condition is known in the stock room. By the time stock is actually diminished to the minimum the replenishing stock from the storehouse is at hand for putting away in the stock room.

III. METHOD OF PROOF

A. DESCRIPTION OF PROOF

Our original verification method consists of two distinct operations. First, the so-called "Burroughs" or "old-and-new-balance" proof. Second, a cross footing of the lowest balances appearing in the *balances* field. The first mentioned proof is applied to only *one* of the two balance columns affected by any group of postings, and insures the fact that all postings on which the proof applies have been *correctly transcribed* from the posting media, and that all old balances in the balance column proved have been correctly picked up, and all new balances correctly printed. The second, or cross-footing proof, insures that all old and new balances in the second balance column affected are correct, and that a number of other conditions are also correct as are detailed later under a "Comparison of Proof Methods."

1. *The Old-and-new-balance Proof.*

a. Posting media are divided into convenient posting groups, say of twenty-five or fifty tickets wherever possible (although under certain of our peculiar conditions it is sometimes necessary to reduce the media of our posting group to three or four tickets). Each of these posting groups is then totaled on a hand adding machine, the amount shown constituting a "predetermined" total to which the old-and-new-balance proof must balance.

b. The old-and-new-balance proof is taken, as stated above, on only one of the two balance columns affected by the group of media which has been posted. Generally this will be the first of the two balance columns, but if this happens to be the "Balance Available" which is apt to contain numerous minus quantities, the proof is sometimes shifted to the other column, viz., "Balance Apportioned," in which very few minus quantities occur. This is wholly for the sake of speed. Minus quantities are as easy to handle by this proof method as are plus quantities, but not quite so much speed is made with a long series of them, particularly if the operator happens to be a beginner.

c. In obtaining this proof a key is depressed on the machine which causes the setting of the machine to move alternately from the add to the subtract position, the previous or the "old" balance, if a plus quantity, being picked up in the subtract position, and the *latest* of the new balances, if a plus quantity, in the add position. The difference between these totals is accumulated by the mechanism of the machine itself, and at the completion of the proof a grand total of these differences shows, which, if the work has been correct, equals the predetermined total of the group.

d. The rule for obtaining the old-and-new balance proof, whereby minus or plus quantities, and normal or cancelling transactions in the same run, can be handled with equal certainty, is as follows:

Old balance to be picked up in position of the *Opposite* sign.

New Balance to be picked up in position of the *same* sign.

Where all quantities are plus the alternating action of the machine with the proof key depressed carries out the above rule automatically, but where minus quantities occur the control lever must be moved by hand to the proper position. This is why a run containing minus quantities requires slightly more time for its completion.

2. *Cross-footing Proof.* The cross-footing is performed by the file clerk on the hand-listing machine and consists of cross-footing the lowest quantities appearing in the *balances* field of the card, wherein the total of the first three columns should equal the total of the last two if all preceding work has been correct.

3. *General Verification.*

a. A check on the fact that the posting is made on the correct card is obtained by requiring the posting machine operator to compare the title of the card with the posting, thus being equally responsible with the file clerk that the correct card is utilized. A check on the fact that posting has been made with the correct control bars is obtained by requiring the posting clerk to verify the correctness of the posting column as the first step preliminary to taking his old-and-new-balance proof, and by further requiring the file clerk who makes the cross-footings also to verify the correctness of that column as a first step previous to taking the cross-footing proof.

b. As cards are proved a vertical check line is drawn down in a narrow check column at the right edge of the card showing that proof has been obtained up to the point where the line stops.

B. COMPARISON OF PROOF METHODS

1. *The Old-and-new-balance and the Cross-footing.* The reason for our adopting an original combined method of proof instead of one of the standard old methods in its entirety, is that no one of these methods seems to be without its weak spots. What we did, therefore, was to select two methods whose weak spots did not coincide, thus obtaining a combination without weak spots. Where one plan is strong we use it. Where it is weak we use the other.

The old-and-new-balance proof, for instance, is positive and absolutely reliable in proving that all posting media were described correctly, that all old balances were picked up correctly and that the machine was properly operated in printing the new balance, so far as these results apply to *one* of the two balance columns; but it is not equally positive in the other. Suppose the old-and-new-balance proof were relied on for verifying *both* balance columns; here is what might easily happen. The same predetermined total, bear in mind, would be used to balance with both columns, and nothing could be easier than for the operator to note that his result for the first column had agreed with the predetermined total and *mistakenly assume* because of this agreement that he has completed the proof. The second column, in which an error may have occurred, would therefore go unproved and the error be undiscovered.

The cross-footing proof, on the other hand, once the correctness of one column had been established, would instantly reveal the error in the other column, whether that error occurred in picking up the posting of the old balance, or in printing the new balance. It would not, however, reveal an error in transcribing the original transfer of the posting from the posting medium to the card. Only a balance with a predetermined total will do that, and therein is a weak spot in the cross-footing proof. But as you see, we don't employ that method where it is weak. It is positive in proving the second balance column, and that's where we use it.

Another strong point of the cross-footing proof is that it is a verification, not only that the error *has been discovered,* but that the card itself has actually been *corrected.* A weakness of the old-and-new-balance proof is that whereas, under proper conditions, it would reveal an error, it would not reveal a neglect on the part of the posting clerk to *correct* that error on the card. The cross-footing on the other hand is an absolute proof that the card is actually correct *as it goes into* the file, since the cross-footing, must be taken as a final operation after all corrections have been made the last thing before the card is filed.

As a final proof it is an insurance against errors arising from obscure causes which can scarcely be anticipated, but which would cause the two sides of the balance field to be out of balance. Suppose, for instance, that through unexplainable negligence an operator ran by all signals and actually replaced in the file a card with an error uncorrected. The next time the card was posted the cross-footing proof would reveal the error, and *would continue to reveal it,* every time a posting was made, until the error was corrected; for a characteristic of the method is that a cross-footing of the latest balances on the card not only proves that the work is correct for the particular entry affected, but also that *all of the preceding balances* up to that point are correct.

2. *The Proof Column.* Just a word here about the absent, and, from our standpoint, the unlamented proof column. We omitted it both for space considerations and principally because it is not a proof in any actual sense of the word. Our combined proof method is a real *balancing proof* in the sense that a trial balance in bookkeeping is a proof, whereas the proof column is nothing but a *checking* device for use in discovering at what point an error had been made after the fact of the error itself has been discovered by other means. Even in this limited function there is only one type of error with which it would be of the slightest use, viz., an error in picking up an old balance. We find from experience, however, that our special card design has almost totally eliminated this particular type of error in the first place. What mistakes we experience are of other sorts, almost never of this. So why the proof column?

The reason why our card design forestalls errors in picking up old business while, as I believe, designs which incorporate the proof column invite them, is a very simple one. The proof column is necessarily a different column from that in which the old balance occurs. This precludes the possibility of using the visible printing point at which the proof column stops for the pickup (and which, by the way, is the only visible indicator point on the machine), as a gauge for selecting the old balance. The old balance must therefore be selected by visual inspection of the entire field, and no argument is necessary to show how easy it would be to select the wrong figures for the pick-up. On simple card forms with medium width machines the standard Burroughs method for getting around this weakness of the proof column was to locate that column far enough to the left of the balance column to allow the latter to just show at the side of the machine when the proof column was at the printing point. The lowest figures in the first visible column to the right of the machine, then, would be picked up as the old balance. But this makeshift would be wholly impracticable with regular posting machines which are so wide as to require a separation of about eight inches between columns for that purpose; and impossible with any width machine where the card design requires the proof column to be located next to or close to the balance column, as indeed our card design would require proof columns to be located, if they were used at all.

By omitting the proof columns entirely, on the other hand, as we have done, and picking up the old balance in the air, the pick-up is made *in the balance column itself,* and the figure to be picked up is stopped automatically by the carriage *immediately over the visible printing point,* where with the carriage back it is so clearly and conspicuously indicated to the operator, that the chance of his putting it into the machine wrong is, as we have proven by experience, practically negligible.

To the contention that on proofs of extremely long runs—say a day's postings— a means of checking or comparison should be provided to find *where* the error occurred after its existence has been discovered, two answers should be made:

First: In runs of *any length* the cross-footing proof pins the mistake down to the card on which it was made just as readily as the proof column, and in addition it does this *automatically* as part of the proof instead of by visual comparison as would be necessary with the proof column. Besides, the cross-footing will reveal a much wider range of mistakes than the proof column, as has already been pointed out;

Second: Extremely long runs should not be accumulated without proving. One of the strong features of the plan under discussion is the positive *control* it exercises over the store room. This is possible only by posting all tickets *before* they are presented to the store room to be filled, and proving them and releasing them in small lots. No ticket is released to the store room for issue, or even posted for issue, unless the ledger record shows stock on hand to meet it. In this way the ledger controls the store room. Otherwise the store room controls the factory, and the ledger becomes merely an "accessory after the fact."

C. DAILY VERIFICATION OF STOCK

As a verification that the stock is in agreement with the ledger records, the perpetual or daily inventory of a certain number of items of stock is maintained. These items which have been inventoried are compared with the ledger records and any disagreements traced and corrected. In our own case we cover the items having an ordinary rate of movement once per month. Very heavy movers are inventoried twice a month, while the very slow movers may be inventoried only once in two months or once in three months.

IV. FILING, POSTING AND VERIFYING ROUTINE

(Special Plans for Obtaining Efficiency in Operation)

A. GENERAL PROVISIONS

In an extensive application of machine posting it is desirable to keep the investment for posting machines down to a minimum, and it is absolutely necessary to make special provisions for attaining technical efficiency in handling the work. In our particular application both these ends are attained by the following special plans:

1. *Two operators are assigned to each posting machine,* one of whom acts as a file clerk, finding the cards and obtaining the predetermined totals of the posting media for the operator who actually does the posting.

Under this arrangement the file clerk is also trained as a posting clerk, as an insurance against holding up the posting machine in case the regular operator should be absent from sickness or any other cause. Furthermore, it enables the file clerk and the posting clerk to change off with each other's duties two or three times during the day, thus making the work less tedious for both. It also affords a check on the part of a second clerk that the correct card has been drawn and the correct control bars used for posting.

2. *A small listing machine is provided* to operate in conjunction with each of the posting machines. By this arrangement the posting machines can be made to operate practically continuously, whereas if the posting machine operator were obliged to find her own cards and obtain her own predetermined totals from the posting media for verification, the posting machine itself would either be idle or engaged on non-posting work an unnecessary portion of the time. Our plan is to make the expensive machines work practically all of the time on actual posting work, and to provide cheap machines for doing work which the latter can handle as well as the posting machines and at much less expense in machine investment.

3. *All posting media are reduced to a unit basis,* i. e., a separate ticket for each individual posting. This is such an important point in posting efficiency that I wish to give it very special emphasis here. I would even go so far as to say that in busy times where the machine installation were working nearly to capacity, the utilization or the non-utilization of unit posting media might mean the difference between the success or the failure of the entire system. Unit posting media permits preliminary sorting and collating of tickets previous to drawing the cards from the file, and means vastly more speed in posting. In our own installation we started to post the apportionments from the original factory copies of orders whereon as many as nineteen different items might appear to each sheet of the order. We found this such a handicap to the department, however, that we very soon changed this class of posting over to the unit media and the immediate pick-up in the department was astonishing.

4. *All posting is done in groups* of tickets representing the same posting operation, not promiscously among different operations.

Furthermore, the groups themselves are divided into runs of not too many tickets each, as was explained before under the discussion of the Methods of Proof.

5. *Posting media should be thoroughly sorted, classified and sub-classified* before being passed to the file clerk. This serves to collect together all tickets of the same sort against which the file clerk will draw the corresponding card, and it enables the posting clerk to greatly abbreviate the posting operation by merely listing in the Transactions Field the individual postings, then taking the sub-total of these postings in the Transactions Field and completing the process by drawing a single set of balances for the lot, rather than individual balances for each separate posting. If the ledger is so large that it is divided into separate sections the plan of pre-sorting will also serve to allocate to each section the tickets applying thereon.

6. *Convenient furniture must be provided* for speeding up the operation of sorting, filing and posting. Speed and efficiency cannot be realized under inconvenient physical arrangements or equipment. Insufficient and illegible finders, for instance, will cut down all the additional speed over hand posting that a thousand-dollar posting machine should normally afford. All of the steps of the process from the sorting of the posting media to the final proof of the result should be thought out and worked out until they function as smoothly as the operations of a well-oiled machine. Three of the devices we have provided for our particular work have been so successful that they are worth mentioning here:

a. A small table for file clerk with a double deck flat space for laying out ledger cards as drawn from the file, and a space at the side to accommodate hand-listing machine. This table is mounted on gas pipe legs fitted with noiseless easily working casters;

b. Small, movable standard including detachable filing tub; This also is mounted on gas pipe legs and casters similar to those of the file clerk's table;

c. Stationary sorting table with numbered pigeonholes for first classification of posting media.

The filing clerk's tables and the filing tubs are equipped with casters so that any table or file tub can be moved to any posting machine with the greatest facility. Our usual physical arrangement for posting is: posting and machine operator on the right; file clerk with table on left of posting machine operator; movable tub of file cards to left of the file clerk.

B. ACTUAL POSTING AND PROVING ROUTINE

The actual posting and proving routine as we have developed it to date, while not necessarily recommended for all conditions, at the same time may serve as more or less of a base arrangement from which any desirable variations can easily be made.

1. File clerk takes predetermined totals and makes cross-footings. Posting clerk takes old-and-new-balance proof. File clerk finds all ledger cards before posting and returns cards to file after posting, takes predetermined totals and makes cross-footings. When delivering cards posting clerk takes old-and-new-balance proof. The file clerk when delivering cards and posting media to the posting clerk will accompany each group of posting media with the adding machine strip showing the predetermined total.

2. The file clerk will be responsible for seeing that all posting media turned over to the posting clerk can be posted to the respective cards to which attached. This applies particularly to assignments, and in practice the provision means that the file clerk will always see that there is sufficient stock on hand free to fill the tickets which are to be posted against the card. If the aggregate of these tickets exceeds the amount in stock, the file clerk will simply turn the card and the tickets over to the head of the Ledgers Department, who will determine either personally, or by investigation, which of the tickets are to be given preference. The file clerk will simply pass on to the next posting media in the group.

3. While the posting clerk is completing the first group, namely, posting the cards and taking the old-and-new-balance proof, the file clerk can be finding the cards and taking the predetermined total of a second group which should be ready for the posting clerk by the time the posting clerk has proved the first group.

4. When the first group has been proved by the posting clerk and returned to the file clerk, the file clerk will take the cross-footings and afterwards file the cards.

5. The third group of posting media can now be taken up by the file clerk, the cards found and the predetermined totals listed, as before described. The routine thus established provides that while the posting clerk is posting a group and proving it, the file clerk will be cross-footing a previous group and finding the cards and listing the predetermined totals of a succeeding group.

6. It may somewhat rarely happen, in spite of the care taken by the file clerk not to hand over to the posting clerk any media which cannot be posted to the accompanying card, that the posting clerk will discover some reason why a medium cannot be posted to the ledger card. In such cases the posting clerk will take his old-and-new-balance proof of such media as he has posted, then switch off the proof lever and add the remaining or unposted media to the total which has already collected in the machine. The final total will then correspond, if the work is correct, with the predetermined total.

C. ROUTINE FOR CARRYING FORWARD OLD LEDGER CARDS

Under average circumstances the following arrangements for carrying forward old ledger cards to new ones will be found requisite.

1. The Apportioned and the Issued columns should be footed and the amounts carried forward in every case from the first to the second side of the card, and from the second side of an old card to the new card. These totals will be cumulative.

2. All balances in the Balance Field should be carried forward both from the first to the second side of the old card and from the second side of the old card to the new card. These figures, of course, are not cumulative.

3. The assigned items in the Issued column which are not checked as having actually been issued from stores should be carried forward from the second side of the old card to the first side of the new card, but need not be carried forward from the first to the sec-

ond side of the same card. When the unissued amounts are carried forward from one card to another they should be written in the Issued column below the total which has also been carried forward, but should appear in red ink with the explanation "Unissued items from card No. ..... Red ink figures, of course, will not be included in the footing of the issued column to be again carried forward.

V. METHODS OF RECORDING VALUES

So far the discussion has been confined to quantity records only without reference to money value, but answer must be made to those who will raise the question: Can your plan handle prices and values against quantities, and if so, how? It can, with the greatest facility, and in any way you prefer. If you wish to control your stores under average unit prices, a slight addition to the Case card, previously described, will take care of the problem. If you wish to maintain separate lot prices, a card nearly identical in form but handled somewhat differently will do that.

Broadly speaking, there are two general plans of carrying values against stores:

A. Plan based on *average unit values;*

B. Plan based on *separate values* for each price lot.

These two general plans result in three separate methods of maintaining the value records and may give rise to as many as five different variations in those methods. The methods and variations are briefly described below in outline form, reference being made against each to the type of card to be used therewith. Specimens of these cards designated as A, B, C and D accompany this description.

A. AVERAGE UNIT VALUES

(Variation 1) - (Use Card C—Fig. 3)

Extend the value of each posting with

a. Actual cost of lot for each *receipt*, or

b. Value figured at latest average unit cost for each *disbursement*.

Prove *quantities* by usual combination of old-and-new-balance and cross-footing proofs, and *values* by the following special method: The *on hand* balance (Column 6) multiplied by the latest average unit price, carried to four or five places of decimals, must always equal the total of "*Value on Hand*" (Column 11). If it does it proves so far as that one ledger card goes:

1. That the old balance of both Quantity and Value were picked up correctly;

2. That all receiving tickets were extended correctly as to total value received;

3. That all disbursement tickets were extended correctly as to total value disbursed;

4. That the extension of all new balances is correct;

5. That the new average unit cost has been correctly figured.

B. SEPARATE VALUES FOR EACH PRICE LOT

1. *Ledger Cards Priced but Individual Postings not Extended for Value.*

a. One price lot only. (Variation 2)—(Use Card A—Fig. 1).

Employ one card only—price to appear on that card. Money value computed, when required, by multiplying *balance on hand* (Column 6) by unit price as shown on the card.

Quantity proof only—obtained in usual way.

b. Two or more price lots. (Variation 3)—(Use Card A—Fig. 1) Employ:

(1) Master Card—*not priced*—to which are posted *all* transactions.

(2) Separate Detail card—*carrying price*—for each price lot, posted for *receipts* and *disbursements* only.

Money value, when required, computed for each detail card separately, as above, by multiplying *balance on hand* by unit price.

2. *Ledger Cards Priced and all Postings for Receipts and Disbursements Extended for Value.*

a. One price lot only. (Variation 4)—(Use Card D—Fig. 4).

Employ one card only—carrying lot price—receipts and disbursements only to be extended for value on that card.

Prove for *quantity* in usual way.

Prove for *values* by multiplying *balance on hand* by Lot Price to equal *value on hand.*

b. Two or More Price Lots. (Variation 5)—(Use Card D—Fig. 4) Employ:

(1) Master Card—not priced—to which are posted *all* transactions *without* value extensions.

(2) Separate Detail Card—carrying price—for each price lot; posted for receipts and disbursements only, but each posting to be extended for value.

VI. PROOF METHOD

A. QUANTITY PROOFS

Master Cards—Prove in usual way—i. e., (a) Old and New Balance Proof; (b) Cross-Footing Proof.

Detail Cards—Totals of last *balances on hand* (column 6) of all detail cards equal last "Balance on Hand" (column 6) of master card.

B. VALUE PROOFS

Last "Balance on Hand" (column 6) multiplied by price should equal last "Value on Hand" (column 11). If it does, it proves:

1. That the old balances of both Quantity and Value were picked up correctly;
2. That all receiving tickets were extended correctly as to total value received;
3. That all disbursement tickets were extended correctly as to total value disbursed;
4. That the extension of all new balances is correct.

Note 1: Master Card and Detail Card to be of different color to make it practicable to file master card with and in front of corresponding detail cards.

Note 2: Card to be oblong, so that different sets can be staggered when withdrawn from file.

Note 3: The base card of four balance columns has been referred to for the sake of simplicity in connection with the above description of methods of recording values. It should be understood that the card wherein the *balance on hand* column has been sub-divided, resulting in five balance columns, is equally adaptable to these methods by employing the additional three-column value field illustrated with cards C and D, and exactly the same method of posting and proof with a single variation. This variation is that, when posting receipts, the removal of stores from storehouse to open stock (subtracting from Column 7 and adding to Column 8—Card A) involves no change in the *value on hand.* For such posting therefore the values should not be extended.

ABSTRACT of remarks of L. H. Ballou, Works Manager of Lewis Manufacturing Company, Walpole, Mass., at the first meeting of the New England Section of the Taylor Society—Boston, May 6, 1921:

Our particular problem is stores. We are manufacturers of hospital gauze. We have the usual inventory of supplies for general use and for plant maintenance. We also have our inventories of raw material and finished stock which constitute the major problem.

Our raw materials are grey goods. Grey goods are quoted daily in the trade papers. They fluctuate not only from supply and demand but also in relation to the price of raw cotton. Raw cotton fluctuates constantly, based on demand and on possibilities affecting the crop for the coming season. These factors give an uncertain fluctuating price to grey goods. It is our desire as far as possible to remove the hazard of this fluctuation by keeping inventories at a low level.

All of our manufacturing is for stock. The demand for "service" in the trade is very high. Usually shipments are made within twenty-four hours from receipt of order. In order to give such service, inventories are necessary at reasonably high levels. Our problem, therefore resolves itself into two sections:

1. How small can we keep our inventory to eliminate the hazard? 2. How large must we keep our inventory in order to maintain a high standard of service?

We have found nothing that has so well met the situation as the Taylor method of storekeeping.

One of the questions that is always raised, and rightly so, is—"Is it profitable?" This can best be answered by quoting from our experiences of the past eight or nine months. During that time grey goods have fallen from $1.35 to $.40 per pound. Fluctuations have been as much as $.15 or $.20 a pound in a week. Such a change is unusual, but a fluctuation of $.03 per pound would not be unusual. As closely as we can determine we have been able to reduce our inventory three million yards or 200,000 pounds of goods, as a result of our Taylor balance sheets. If we assume that a fluctuation of $.03 per pound is not extraordinary and that the inventory hazard has been reduced by 200,000 pounds there would be a saving of $6,000 with each $.03 drop in the market.

The cost of operating the storerooms is no greater under the Taylor plan than under another method of operation. That expense is determined by physical goods handled rather than by the method. If there is a supplementary expense it is in the cost of operating the balance sheets. This cost is approximately $7,000 per year. If, as a result of these balance sheets, inventories have been reduced 200,000 pounds then practically the entire cost of a year's operation is saved by a single market drop of $.03 per pound. Such a change may be repeated a number of times in the course of a year.

Possibly the example that has been selected may seem extraordinary because of the speculative nature. I have had experience in other lines of industry and with other stores problems and I feel that the opportunities for economy are relatively as great. The economy may not always be measurable in terms of inventory shrinkage; it may be in the intangible but nevertheless real economy of having been able to deliver the right materials at the right place at the right time and thus overcome delays that would otherwise occur.

METHODS OF COMPENSATING SALESMEN[1]

(Abstract of a Report)

By C. K. Woodbridge[2]

In speaking of compensation methods, one having in mind the present situation said: "The methods formerly employed have not been suited to these new conditions." All will admit that new conditions are continually met in business and this non-debatable fact is probably the reason why a set compensation plan never fits for long and is a subject for constant readjustment. In our opinion it will be a continuous subject for readjustment. Conditions on which to base compensation do not remain the same.

The ability of the man, the nature of the job to be performed, the value of the accomplished task to the employer, the individual standard of living, and the right to save and accumulate, are among the factors that should determine the amount and form of compensation.

Since this is a report on methods of compensation for salesmen and is to be followed by discussion, a common agreement as to terms seems desirable.

Analyzing the use, our understanding as to the meaning of terms is here noted:

Compensation: Making terms suitable to or for—a counter-balance;

Salary: A predetermined periodical allowance made as compensation to a person for services;

Commission: A compensation accruing to an agent or factor indeterminate in amount; usually a percentage of the value handled by the factor;

Bonus: An extra allowance; that which is offered or won as an honor and reward for superiority or success, as in a contest;

Task: A specific amount of labor required or undertaken.

COMPENSATION PLANS IN USE

From a study of the subject as presented in *Printers Ink* of April 7th, The Dartnell Corporation Report No. 17, *Practical Plans for Compensating Salesmen;* forty questionnaires from national sales organizations, and a bit of experience, a few of the known variety of compensation plans now in use are here given. Only a brief reference will be made to some, since the nature of these plans is in most cases of common knowledge and since the sources of information for the most part are accessible to all. We find the following:

1. *Straight Commission.*

2. *Sliding Commission*: A commission the rate of which automatically increases as predetermined sales goals are reached.

3. *Group Commission Plan*: Merchandise divided into groups, each paying a different commission.

Commission plans are extensively used. It is the opinion of many that they place the sales expense and risk on the other fellow. In practice they develop a tendency to oversell. Cold canvas for prospects is neglected. The relationship of salesman and house is not close. Too much money is made in boom times, too little in hard times.

4. *The Straight Salary*: This plan is probably used by fifty per cent of all concerns. The man with the fixed income, having faith in his house and a quality product, works as a partner in the business and increases good will for his firm. It lacks, in the minds of a great many, proper incentives for better than ordinary performance.

5. *Salary and Commission*: This is a combination of the two most widely used compensation plans. It is favored in times when selling is difficult, as at the present moment. By it a salesman is supposed to profit through his industry.

6. *Salary, Expense and Commission*: In this salary and expense are deducted from commission earned on sales, and if there is an excess it is paid to the salesman.

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[1] A report presented to the Cleveland, O., meeting of the Taylor Society, May 19, 1921.

[2] Sales Manager, The Dictaphone, New York.

7. *Salary and Commission on Sales* over a fixed quota or task (sometimes called salary and bonus): Making quota is an exciting game and if the rules are fair and the quota not unreasonable, it is entered into with great enthusiasm by salesmen.

8. *Salary, Commission and Bonus*: This combination introduces the bonus in recognition of excellent or superior service. The introduction of an extra allowance for excellent or superior service has created many forms of bonuses. These include:

a. *Bonus on special features*: An amount paid for special accomplishments, such as selling package goods more than bulk goods, or any accomplishment of special profit.

b. *Bonus on net profits*: A percentage on different classes of sales according to profits; for instance, a certain per cent on strictly city business, a little more on suburban, and the maximum on country business.

c. *Bonus on total sales*: This encourages volume building, sometimes at the expense of profit.

d. *Bonus on quota excess*: A quota or task is assigned to each man which represents what he ought to sell normally, and then a bonus is paid for all sales in excess.

e. *Bonus on low sales costs*: A reasonable cost of selling is established, and a bonus paid to salesmen if his cost is less.

f. *Bonus on service to house*: Paid on estimate of constructive value of salesmen's work.

g. *Bonus on increased efficiency*: To correct weaknesses and develop sales ability.

h. *Bonus on promotional work*: Paid for dressing windows, opening up new dealers, selling "hards nuts," etc.

i. *Bonus on branch office sales*: Bonus paid to branch on total sales over quota, and pro-rated among salesmen. This promotes co-operative work.

9. *Task and Bonus Systems*

Since the salesman spends a greater portion of his time before the sale in preparation and after the sale in follow up, than he does in the actual sale, this plan of paying for the tasks performed and giving bonuses as incentives for excellent performance is of great present-day interest. Salary and expenses must be provided for.

The Dictaphone sales organization is paid a salary for specific tasks to be performed under direction, such as:

a. **Daily calls on owners.**

b. New prospects and follow ups.

c. Demonstrations and the supervision of installations according to unit sales as a bonus.

Another concern in our industry pays for tasks as follows:

Each canvassing call	$ .10
Each solicitation call	.05
Each demonstration call.........	.25

A drawing account is allowed. These task payments help reduce the amount drawn. A commission is paid in addition on the sales of equipment. This latter is considered a bonus.

10. *The Point System*

Quoting a fellow sales manager: "We measure the value of a salesman's time by the volume of goods sold during a certain period or at a certain percentage of cost. Of course the final objective and purpose of the field organization is to sell goods, but much of the work of selling goods is accomplished by doing other things than writing up actual orders. The field sales organization has other duties to perform which are as important to the sales work as taking orders for goods. In fact, much of this work is at times more important than the actual booking of volume. To properly measure the results or value of a salesman's work, it is necessary that we fix a value on each of the duties to be performed and credit that salesman when he has performed those duties."

The point system involves the use of a common denominator. The sale of the product requiring the least resistance is usually that denominator. A point is given for every dollar of that one product sold, and upon that standard all other values are determined.

Penalties are fixed for not doing the things the company wants done.

The value of a point having been determined, the salesman's salary, figured in points, will indicate what he had to do in tasks to justify his pay. If $.004 is the value of a point, 5,000 points would be necessary to get $20.00 a week. The following factors are used in giving points:

1. *Credit for selling desirable product*:

	Points Credit	Points Debit
Basis of reward one point per dollar sale.		
(a) Easy selling advertised product...............	1	
(b) Products offering double net profit............	2	
(c) Products offering triple net profit..............	3	
(d) Products especially hard to sell...............	2	
(e) Products that have very high repeat qualities..	2	
(f) Products that are being closed out............	2	

2. *Credit for securing particularly desirable business*:

(a) New customer who discounts bills	200
(b) New customer who pays within thirty days	150
(c) New customer who takes sixty days or over	100
Half credit when order is received by mail.	
One-quarter credit when order is closed by office.	
Penalty for loss of customer—"six months without buying"	150

3. *Credit for co-operating with Credit Department*:

(a) Information which results in saving account	100
(b) Local investigation of new account	50
(c) Valuable information regarding old account	50
Penalty for bad debt through failure to report	100
Penalty for bad debt not due to salesmen	50

4. *Credit for co-operating with Advertising Department*:

(a) Report on dealer advertising activities	2
(b) Getting dealer to use store advertising matter	10
(c) Getting dealer to use dealer electrotype	10
(d) Securing mailing list from dealer	10

5. *Credit for co-operating with Sales Department*:

(a) For every report turned in	1
(b) For calls made without sales	2
(c) Information of interest to other departments	1

6. *Penalties and Rewards for Quality of Salesmanship*:

(a) Misrepresenting facts	1000
(b) Complaints from customers	500
(c) Goods returned "in addition to credit"	100
(d) Falling off in sales over last year	100

One large national concern in describing the point system says:

"We need a measuring stick by means of which we can measure all territories and all men alike under varying conditions in varying territories, and still show the good salesman in proper comparison, whether he is in good or bad territory.

"We take the three largest considerations in the salesman's work, viz., calls, orders and volume, and after determining the approximate number of calls, orders and volume in units of retail sales, which we expect to accomplish during the year, we fix on each of them a value of points to be credited to the salesman accomplishing one of the tasks.

"This valuation will be as follows:

For each call	5 points
For each retail order taken	15 "
For each unit sold retailers	1 "

"Therefore for each call a salesman makes he will be credited with 5 points, for each retail order taken regardless of size he will receive credit for 15 points; and in addition, he will receive 1 point for each unit of sales.

"We find by actual comparison with the range of calls, orders and units of sale, based upon the average experience in all territories over several years, that this valuation keeps the day's work balanced up about in accordance with the importance of the work done.

"In territories where a large number of calls per day is possible the orders run small; in sparse territory, where few calls per day are possible, the orders run larger.

"A man, working for distribution among the small trade, should make a lot of calls and take a large number of orders, but the volume would be small. Another salesman in a country territory would be able to make only a small number of calls and take a few orders, but the country orders run larger and his volume would, therefore, average up his day's work."

The use of the point system has produced:

11. *The Rating Plan*

This plan aims to pay salesmen a bonus over and above the salary and commission on the basis that if a salesman can be made to overcome his weaknesses he will be a greater producer. Men are rated according to the quality of their work each month. The following gradings were used by one company.

Integrity (indicated by letters of complaint)

Aggressiveness (shown by new accounts opened, etc.)

Industry (shown by number of calls made, etc.)

Economy (indicated by expense account)

Salesmanship (determined by large profits sales)

For each month according to fixed standards for performance, a one hundred per cent record might be worth $50.00; accomplishment up to one hundred per cent would be paid for accordingly.

12. *Sales and Service Quota Plan*

This consists of:

1. A sales quota and a service quota. This plan establishes a quota based upon previous year's sales. Other methods are known for establishing quotas. The service quota is the number of tasks that should be performed in relation to total calls.

2. A point system by which actual sales and service are translated into credit points.

3. A method by which the credit points (the work done) are translated into earnings.

4. Salary and expense allowance must be arrived at, based on average amount paid for some period.

5. A plan for paying to the salesman the difference between his total credit points (actual sales and service performed) and the total debit points (money in salary and expense allowance advanced).

13. *Salary and Percentage of Saving Plan*

A sales manager in the West has developed this plan after many trials: The company sets a certain percentage figure to cover the expense for each salesman's territory, and by increasing his sales or reducing his expenses the salesman can effect extra earnings. Each salesman is given a sales quota for his territory. Each one similarily is given an expense budget based on analysis of the cost covering this territory in the past and modified to meet present costs.

If the salesman's quota is $200,000 per year, and his salary plus expense budget is $6,000 per year, his given expense rate will be three per cent. Now, if he increases his sales to $250,000, he will earn an extra three per cent on $50,000, or $1,500. If he keeps his sales at $200,000 and reduces his total expense to $5,000 he will earn an extra $1,000.

Out of about forty concerns of whose methods of compensation we have knowledge—through a questionnaire—twenty-five paid straight salary, salary and commission or salary and bonus; nineteen paid straight commission, but thirteen of these allowed drawing accounts. Therefore it is evident that practically all consider that the salesman must have some regular income that he can depend upon, thus recognizing the importance of providing for living and expenses.

As between salary alone or with a commission or bonus, and drawing account against commissions, the practice is somewhat more in favor of the salary plan. The other soon hangs a millstone around the salesman's neck in the shape of a debt that kills his effort. Practically all those dealing in a straight commission plan offer prizes based on the introduction of contests in the sales program. About seventy-five per cent of all use prizes and many give prizes in special sales contests introduced for the purpose of creating the competition of play in the game of selling. Contests pay the individual contestant in the coin of accomplishment. The world loves a winner and the winner likes to be reminded of his success.

After all, it's team work that counts, and when you have the proper spirit and the proper attitude toward the organization, you can get great sales results from contests; and it's not the size of the reward that counts so much as it is that something which makes the man feel that winning indicates his standing among his fellows.

The statement is made about commission methods that salesmen sell their personality or else plan merchandising without a bit of service. The importance of service is perhaps the excuse for extra pay in the form of bonus—commission and tasks. After all, the use of bonus plans is to increase the producing power of the sales force.

Methods of compensation for salesmen require an analysis of the job to be done, and these jobs differ in different lines. Find out what the operations are and decide how much of the total sum you are willing to spend should be paid for each operation. Then take into consideration the individual, his cost of living, his expense, his ability and his right to save and accumulate. These factors should determine compensation.

It is evident that no one has yet discovered a common sales compensation plan that will fit all types of business. Granting that one plan may be adaptable to groups covering one class of business, like hardware, groceries, etc., that same plan may not fit all factors in each company's sales work, and we do not think the one plan should necessarily be common to all the individuals on the sales force.

THE Department of Labor, through the Bureau of Labor Statistics, is making a study of the methods of adjusting wage scales, including collective wage agreements where cost of living figures enter into the wage adjustment. To that end, the Bureau of Labor Statistics wishes to communicate with the various companies, members of arbitration boards, labor managers, or others who are using cost of living figures in the determination of wage awards.

If any reader of the Bulletin of the Taylor Society who has not already communicated with the Bureau is using cost of living figures in the adjustment of wages, it will be appreciated by the Bureau if he will write to the Commissioner of Labor Statistics, Washington, D. C., and inform him of that fact.

IN an article on "Waste and Labor," by Stuart Chase, in *The Nation*, July 20, 1921, we find the following: "The engineer has already introduced the cult of efficiency ... 'Efficiency' sits in judgment upon the individual plant, or the individual process, seldom questioning the relationship of the output to human wants, the relationship of the labor involved to human psychology, the relationship of the plant to the industry, or the industry to the whole industrial mechanism ... More constructive have been the proceedings of the Taylor Society—a group of progressive engineers—who, out of the groundwork of the old 'scientific management,' are slowly evolving an approach which comes close to the fundamentals of waste."

MAN MANAGEMENT: A NEW PROFESSION IN THE MAKING[1]

By Meyer Bloomfield[2]

THE familiar story of the specializations in modern engineering is illustrative of processes operating today to shape various kinds of human services into recognized and esteemed professions. The record of industrial progress is two-fold; one is the story of *applied science*, the other of *applied man-power*. The ancient sense of the term "engineer" was confined to military purposes—to works connected with war preparation and warfare.

When the knowledge employed by military engineers began to be applied to the building of roads—that is to say, to civil purposes—a new branch of engineering started, and the civil engineer took his place alongside the military engineer as a professional man.

The keynote of this departure and specialization was effectively sounded in a sentence found in the charter of the London Institute of Civil Engineers dated 1828, which described the work of its members as the "art of directing the great sources of power in nature for use and convenience of man." No truer characterization of expert service has to my knowledge ever been phrased. Some such purpose underlies all sound industrial practice and guides all intelligent executive direction.

American industrial history, the specialization of technique which have come into it, and the promotion of the professional service—find their explanation in that purpose just quoted.

THE FIRST PERSONNEL PROBLEMS

All new countries—our own colonial history shows it—are confronted with two typical personnel problems. First, the scarcity of labor; second, the instability of labor. These two are the most ancient of so-called labor problems. They account for the institution of slavery in our history, white as well as black, for indentured and bonded service was kin to the ownership of black workers. Many reasons account of course for the existence of the two labor problems just mentioned, in our early history. The author of *American Husbandry* (1774) complains that "nothing but a high price will induce men to labor at all and at the same time it puts a conclusion to it by so soon enabling them to take a waste piece of land."

PIONEERING

We are accustomed to think of other nations as the great colonizing powers. There has never been colonizing and pioneering anywhere on the scale such as this country in its own development has shown. The United States is the chief example of conquest of wilderness, subjugation of natural obstacles, mastery and peopling of once unsettled territory, expansion, resourcefulness, self-reliance, and creative discontent. These tendencies have left their impress on American character, have given the American type its "set" of mind; and they are as efficacious today as they ever have been, tho less picturesque in manifestation. It is customary for chroniclers of American industrial history to divide our growth into definite periods, the last of these periods being described as that of the disappearance of the American frontier. This took place about 1880 with the end of free government lands. This period is said to have marked a turning point in our history as indeed it did. With the vanishing of the physical frontier began, however, a series of conquests and developments of a kind as far-reaching as any which preceded. There began an overhauling of our educational system, particularly on the vocational and technical side, science in management began to take shape, and the problems of labor and labor relations began to find expression in contemporary forms of preventive as well as protective legislation, while modern industrial service, modern professional specialization of management as well as of labor organizations, all have started in our time.

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[1] An address at the Springfield, Mass., meeting of the Taylor Society, Feb. 25, 1921.

[2] Bloomfield & Bloomfield, Boston, Mass.

THE NEW FRONTIER

The American is always heading for a frontier. He'll make one if it doesn't exist. The axe and gun may be needed no more, but organizing power, application of science, application of human insight to win the best co-operative human result,—these become the instruments of exploration and mastery. The economic achievements of industrial imagination are as dramatic as have been those of physical courage and perseverance in wrestling with nature. We have sufficient evidence all about us to believe that the service idea creates markets quite as effectively as does manufacturing ability.

Our first personnel problem, as I have already mentioned, was to secure men willing to work. This was typically the problem before the middle of the nineteenth century. The service idea since then applied to labor power has given rise to the question how best to build up and maintain the working force as a stable, reliable and co-operative body.

Shoemaking in Lynn was once carried on, as we know, in the homes. Farmers and fisherman had their little show shops. When the Lynn shoe manufacturer received an order his practice was, as the phrase went, "to issue the tidings." A far different situation confronted the manufacturer when all the labor on his product came to be carried on under one roof. It is of interest to recall the fact that corporations in this country were devised in order to bring together the small savings of the people for purposes of large industrial enterprise.

Our banks and insurance companies started with state encouragement and backing in order to win over small owners of capital. Shares of stock were the device used to attract the small investor. It was a democratic principle which was invoked. The small stockholder believed that he held a franchise with certain rights in the corporation. Common action, as well as individual enterprise, have always characterized our industrial history. It is more than a coincidence that, with the vanishing of those pioneering opportunities to strike out into the wilderness, there began what we might call the forms of contemporary industrial pioneering.

Within our generation these influences have been at work opening up new areas or more fruitful areas of effort such as science in management, applied psychology, vocational training and guidance, industrial legislation, the present-day types of labor organization, programs of labor relations, industrial service within the plant, experiments in joint industrial effort between management and the working force, and new professions connected with the executive, technical and the business direction of industry.

What do these developments signify? That there lie before us domains of industrial pioneering as large as any we have known. The tools of service and of leadership—service based on insight into human nature, and leadership based on the loyalties of men—are busily employed in unlocking new resources of human productivity.

INDUSTRIAL LOYALTIES

Organization, as the present day industrial executive understands the term, is something vastly different from its older implications. Just as we instinctively favored the volunteer over the conscript in the early days of our war, esteeming the patriotic quality in a man's offering himself through nothing more than moral compulsion, a high sense of duty, so we have begun to recognize that such motives and impulses represent precious assets in industry. The volunteer spirit in an industrial personnel is the most valuable quality which it can possess.

What aims can all our personnel and industrial service projects have if not to release and mobilize productive good will? The personnel which selects you and chooses to work for you will be fully as good as the personnel which, through necessity or chance, has drifted into your shop.

An employment department may do and often does do a most excellent job with this latter class. But if I were an employer I should dread the might of the competition from a rival whose personnel represented a mutual instead of a one-sided selection.

A PROFESSION IN THE MAKING

The story of personnel administration during the decade past is a story of the growth of service and leadership maintained on a professional level. The true meaning of personnel activity will not be understood unless we bear in mind the process by which leadership becomes a thing of meaning and secures the key to power.

Leaders are born, we like to say. It is far truer to say that leaders are made—whatever their inborn gifts—made by their followers, made by conditions, by the nature of the effort to be exerted, obstacles to be overcome, opposition to be faced, and by the methods which must perforce be used to win success.

May I dwell a little further on this point and illustrate my meaning? There is a law of evolution which seems to be at work in the realms of leadership. If you watch any movement grow over a period of years, if it really grows and has any vitality and future, you are struck by the changes which take place in the types of the spokesmen, the leaders, the men at the top. Take, for example, our city and town governments. For a long time the good fellow, the orator, the dispenser of easy favors, the champion promiser, holds the center of the stage. There comes a time now and then when managing a city comes to be regarded as a business, financial, or an engineering enterprise. When this connection takes hold of the electorate, there is a chance for the first time to elect a capable administrator, and the speechmaker gives way to the less vocal executive.

The leadership of labor unions shows this evolution of type even more strikingly. From the rough, two-fisted leader of some years ago—the type still extant where conditions favor him—to the skillful negotiator and business agent of today, there is transition full of instruction.

Whatever our views may be as to labor unions and their policies, and I'm not here interested in making out a case for or against them, we may feel certain that the possibility of better leadership for the labor forces or for any other organized human forces, rests largely on the vision and the attitude of all of us. It is in this sense that I insist that leadership is a product and not a self-created thing.

We say nothing new when we maintain that desperation breeds one sort of leadership, lack of confidence another sort, while candor, fair dealing, mutual understanding and reciprocity, bring to the top still another type.

Industry on the whole—or more specifically, industrial management—has much to do with determining what kind of spokesmen and representatives the rank and file shall support. My reason for dwelling on this point is a belief that the most beneficent result of personnel administration is the sustaining of helpful types of leadership both on the side of management and on the side of the men. This result of good personnel work gives it, in my judgment, its fundamental place in modern industry; for it is industry's final guarantee of stability and prosperity.

THE IDEA OF PROFESSION

I know of no idea which holds out so many possibilities, if we energetically apply it to any vocation, employment, or job, as the idea implied in the word profession. Whoever first thought of management as a profession was a human benefactor.

Whoever first devised a program for training men to do what they had hitherto done self-taught, or not taught at all, made a big contribution to industrial advance.

It was some realization of what had lifted despised and probably menial employments of the past into modern professions which had most to do with the start of the personnel movement as we know it today, and the creation ten years ago of the new vocation of employment manager and personal director.

What is true of the progress of occupations from a menial to a professional level is true of the sciences themselves. They became practical when they became exact. The science of mechanics was harnessed to human service when its laws made prediction possible. Bacon said, "Study the laws of nature in order to command by obeying her."

The personnel dictum is; "Study the human nature you deal with in order to win leadership by co-operating with it."

We can get a good sidelight on the rise of a profession of personnel management by recalling briefly what has happened in the growth of other professions.

At the close of the American Revolution only a small proportion of the practicing physicians had any medical degrees. It was not until thirty years ago in this country that legislation began to give the public some protection against incompetent practitioners. Trained lawyers were even fewer in number. Indeed, the lawyer was looked upon with suspicion in some of our colonies.

Until recently the doctor's office was the medical school; the lawyer's office the law school.

In New England, in the early days, the clergyman was sometimes the only physician. Obstetrics was in the hands of dangerously ignorant midwives. Physiology, organic chemistry, pathology and surgery, as we now recognize them were unknown. Dentistry had to fight for recognition from the medical fraternity.

Pharmacy in this country was once a matter of mere apprenticeship. This is to say, any ignorant boy could dispense death-dealing drugs.

The village blacksmith and the fearful horse doctor were the veterinarians. Much as was the case among the Indians, we good hard-headed, practical people have permitted "enchantment in any form." Educated practice is taking the place of quackery in every form of occupation which has reached the stage of service and leadership; that is to stay, the professional idea promotes fitness, training, measurements, standards, a code of ethics, and ideals. These are the dynamic profession-builders and these fundamentals have been unfolding in the personnel field.

When the Boston Employment Managers' Association was started ten years ago, it was with the idea that building up of a working force and dealing with men in their work relations, was a job which had a real professional content. The thought was not a new one, because it came from comparing employment practice in various plants and establishments.

One had only to observe what men like A. Lincoln Filene and Henry Dennison were doing then, what they were interested in working out, to get sufficient stimulus to think along personnel lines.

A few simple principles were back of the formation and the first year's program of the Boston association. The men who came together as members had to do mainly with the hiring of help. It was thought that work of this sort justified a sort of trade organization for exchange of views and experiences. There was none in existence for this type of activity and yet it seemed that the positions which these men held were among the most important and difficult of all executive jobs.

By the fact of association for discussion and common counsel a start in an art of handling men and a science to guide it were made possible. It would be too much to claim that there is an art or a science or a full fledged profession of personnel management today. But the progress during the past ten years towards the goal is unmistakable. Soon after the start of the Boston association the plan was suggested for a course of lectures and a training program in employment management under college auspices. To the Tuck School at Dartmouth College goes the credit for giving the first course in this subject.

Dr. H. S. Person, then its Dean, was the first educator connected with a college school of business to give his warm approval to the plan and capable energies in launching it. In this work he was supported by Dr. E. M. Hopkins, now President of Dartmouth, who was then in a position by reason of his close touch with Dartmouth affairs and his contact with business to make his support decisive. Since then the progress of the training idea for employment and personnel work has been such as to make it now an ordinary feature of the business curriculum in colleges and universities.

Employment and personnel associations spread throughout the country, and four years after the Boston association began, the first national conference on this subject was held.

The man-power problems which were created by the World War and our entering into it marked the turning point of interest in the subject which we are considering.

Inasmuch as this paper is not intended to be a history of the movement itself, or an account of the technique and detailed practice which distinguish it (the literature on this subject is now sufficiently large and familiar), I must pass over many interesting phases and by-ways of the subject. I have been asked to deal with the fundamental conceptions in the movement.

The war record of personnel work has given it a rather dangerous acceleration. The recent business depression, however, has somewhat checked some of its exuberances as well as worked a regrettable sacrifice of valuable efforts. But the fact remains that the movement has grown in some directions too fast for its own good.

It has been the fate of every newly-developed service to attract what Theodore Roosevelt called the "lunatic fringe." The efficiency movement has known it and so has every other specialization of service. Time and a better perspective will weed out undesirable features; familiarity with the best work that is being done, contact with the sound practitioners in this field, more information, more experience, combined with the standards enforced by training courses under university auspices, all these will help lift personnel management to a plane where it will win confidence and support.

There are many unsolved problems in this field, and I am happy to say that there are as yet very few formulas and prescriptions. Much of the work is still in a fluid and provisional stage, as it should be, although the foundations for responsible practice, conscientious service and an acknowledged place in management have been laid. The future is big with opportunities. Whatever technical specializations may grow out of the general conception of personnel management, we need to keep in view that the key to them all is service and leadership.

In view of the tendencies just discussed how should we sum up the growth of the personnel work conception during the ten years past?

In the first place, the personnel movement, as we now know it, grew out of an attempt to institute a sort of professional association among those who were hiring employees. The purpose of the association was, as we have seen, to compare experiences in order to set up standards for good practice. Here was one beginning in the modern art of handling men. There could not be a science until many enlightening experiences were recorded and interpreted.

A technique of man management was thought about. It seemed that if this tendency could establish itself in practice, more real good could be achieved than was possible to the conventional forms of welfare work, which often lacked analysis, self-criticism and human insight. Moreover, the good which the latter work could do was often vitiated by sentimentality, if not self-deception.

An economic argument of great value came for this new movement by the "labor turnover" studies made nine and ten years ago—the phrase "labor turnover" was then coined. There was a telling mass of evidence of human waste made in terms of financial waste. There was also a positive as well as a negative argument early established—the experiences of progressive managements with good employment methods enlarged to the range of a real personnel program showed interesting results by way of teamwork, stability and output.

The movement seemed to be growing into what might well be described—as frequently it was—as Human Engineering. It struck the human note amidst a somewhat mechanical treatment then of organization and production problems.

The professional motive in the movement kept in the foreground the note of service and leadership. The engineering note encouraged the use of systems, records, forms, plant surveys, job analysis and specifications, intelligent selection and helpful supervision.

Sometimes one feature of the movement, sometimes another, predominated—too much sentiment, or too much system. A true proportion could not be expected always. We centralize too much, then decentralize too much, then swing back again, or stand still for a while. Sometimes even we cannot see the men for the forms. But we need not feel disturbed—for all these things are signs of health.

The main point is that personnel work has made its place as an important function of management, that it is on the way to an art and a science of dealing with collective human nature, that such work exacts professional qualities for its success, and that it is so broadening in scope that now it is often a bureau or a division of an Industrial Relations Department. In other words, personnel administration has come to be looked upon as a phase of the whole problem of relationship in industry. At this stage great pioneering opportunities present themselves. Many experiments will be tried; some will fail, some will succeed. But they will be tried because the yeast of the service and leadership idea is now a normal feature of industrial thinking.

Counteracting the tendency to diffuse personnel work into a sort of fog of vague industrial programs there will always be, among clear headed workers in this field, an insistence on sharp definition and clean-cut practice, so far as the technical side of the work is concerned, and a modest, studious and open-minded attitude with regard to the larger opportunities and industrial relations programs which are beckoning. Again, these tendencies are signs of health and a challenge. The only blunder would be, in a time such as ours, to be content with doing nothing, to be a passive onlooker, to grow cynical or hopeless because no perfect or exact solution is in sight.

Somehow, if we expect to hold our proper place in industry—as individuals or organized units—we must take an interest in what is now the supreme personnel problem—that of giving to the personality of the anonymous worker its chance to self-recognition and self-respect, these mainsprings of all big human effort. The job of putting man in management is about as worth while, practical and profitable as any that I know.

When paganism was in flower, with its temples, altars, and wonderfully made idols, there flourished a sort of labor union, a well-organized craft of "Image Makers." These men were supposed to be working for the gods. They were called god-smiths. Presently came Christianity and these idol makers saw that they would be out of a job, if this new movement succeeded. So they offered as stiff an opposition to the coming of a new era as the Founders ever encountered.

It is a great thing to know how to work with the coming good.

The most practical fact in the world is an idea that works. "Every one of these hundred of million human beings," says H. G. Wells, in his *Outlines of History*, "is in some form seeking happiness, is driven by complex and conflicting motives, is guided by habits, is swayed by base cravings, by endless suggestions, by passions and affections, by vague, exalted ideas."

This is the human stuff with which personnel administration is busy trying to make a going organization. We do not intend to repeat the mistake of the god-smiths and fight for idols of our own making. Rather we want to understand the human nature we deal with better, and trust to common sense and our professional equipment and ideals to guide us in our practice, believing that our growing capacity to serve and the loyalties which we win thereby will head us in the right direction.

REVIEW

Employee Training. By John Van Liew Morris, Ph. D., McGraw-Hill Book Co., New York, 1921 Pp. XI, 311.

A strong advocate for the return of apprenticeship as a means of meeting the demand for trained workers in the industrial field may be found in the author of this book.

The length to which industry has gone to solve its own problem of training is treated by type studies of thirty-five or more organizations, chiefly manufacturing and allied industries. These plants the author visited personally, studying the educational programs in progress carefully but not exhaustively. As a result of this personal investigation industry has found education to be, to quote Mr. Morris, "not philanthropy or charitable paternalism but an essential function of a well-organized, productive corporation."

According to Mr. Morris a revival of the system of apprenticeship is the most desirable and economic means of spanning the gulf between the elementary school and the industrial field wherein the manipulative skill demanded requires "an extended period of participation for mastery." Mr. Morris laments the apparent inability of the present school system to cope with the problem of preparing for industry. The following in this connection is interesting: "Apprenticeship to a craftsman was for centuries the mode in which these arts were maintained and transmitted. But the conditions of modern industry have made apprenticeship ineffective and virtually obsolete. The master of former times has well-nigh disappeared; he is replaced by the large employer out of touch with his individual workman, whether young or old. These preliminary stages of industrial training which were in former times provided by apprenticeship should now be undertaken by systematic trade schools, and should be a part of the general system of education. The time is not distant when the normal entrance to a trade will be through such schools precisely as the normal entrance to these so-called liberal professions is through their professional schools." (F. W. Taussig. "Principles of Economics" Vol. I, pp. 103-4).

The book is divided into five main divisions. The first four outline comprehensively four distinct classifications of current, industrial educational programs. With names of organizations visited illustrative of each day they are as follows: (1) Comprehensive Programs for Apprenticeship and Special Training: Westinghouse Electric and Manufacturing Company; General Electric Company, Schenectady Plant; Goodyear Tire and Rubber Company; Ford Motor Company; Watervliet Arsenal; Mergenthaler Linotype Company; Carnegie Steel Company. (2) Programs Emphasizing Apprenticeship: R. Hoe and Company; Brown and Sharp Manufacturing Company; Yale and Towne Manufacturing Company; Westinghouse Air Brake Company; Fore River Plant Bethlehem Shipbuilding Corporation; United States Navy Yard of Brooklyn; Atchison, Topeka and Sante Fe Railroad System; American Locomotive Company; R. H. Donnelly and Sons Company. (3) Programs Emphasizing Special Training; The Submarine Boat Corporation; Dennison Manufacturing Company; The Sperry Gyroscope Company; the United Shoe Machinery Company. (4) Programs of Primarily Technical Instruction; Habirshaw Electric Cable Company; Shepard Electric Crane Company.

Division 5 is a comparison and evaluation of the different types. Here the comparative values of the "Pick-up Method," "Training by Foremen," "The Helpers Method," "Special Floor Training," "The Vestibule School," "Upgrading or Promotion Training in Special Shops," and "Supervisor Training" are shown. Through it all "Apprenticeship" holds first place.

Mr. Morris stresses the fact that "Job Analysis" has become "Man Analysis" and recognizes the field of personnel as an important factor in the industrial situation.

There is a useful bibliography divided as follows: General References on Training and Education in the Industry; Special Training; Apprenticeship, General, Training in the Industry for Technical and Executive Positions; Public Industrial Education; Public Industrial Education Part Time and Continuation Schools. Program outlines and charts from various organizations are also helpful. As a compilation showing the concern felt and the effort to meet the problem of training for industry, "Employee Training" is a valuable contribution to industrial literature.

Henry C. Metcalf

UNEMPLOYMENT SCORES[1]

By Morris L. Cooke[2]

THIS is an argument for the adoption of definite standards of measurement for the phenomena included under "Unemployment within Employment."

The maximum relief from the evils attendant upon unemployment will come about through a localization of the problem within the individual manufacturing plants. Continuous employment is an absolute prerequisite for constantly lowering costs. In an economic sense all idleness during predetermined hours of work is waste. Unemployment insurance schemes, whether operated under private or state auspices, and under which the rate will necessarily be predicted upon the plant's previous record in maintaining steady employment, leads to a new interest among employers in unemployment. The Unemployment Score is the best all-round test of the effectiveness of management—the most searching and significant report to reach the manager's desk.

The time seems to have arrived when we must pull our discussion of unemployment down out of the skies of speculation and interpret it in terms of actual, every-day shop practice. This paper deals with the part any individual manufacturer can play—in fact, must play—if he would hold his own under conditions likely to obtain in industry of the near future. Unemployment in the large is an insoluble problem. It is only as we break it up into its constituent parts that we discover the remedial procedures. Nearly every representative manufacturing plant regularly collects the data required for the studies here recommended. But only a few plants here and there—and then in spasmodic fashion—have so collated the data as to reveal the relative significances of the various causes contributing to the total of unemployment.

Almost without exception our heretofore recognized standards for industrial management are in flux—in the crucible of change and refinement. It is equally true that all those criteria by which we seek to test the effectiveness of our industrial organization are in process of revision. Yesterday's satisfaction with methods and results is today's divine discontent. Hence it behooves those of us who seek a place in tomorrow's sun to keep our technique so fluid as to be able to check performance with the measuring sticks of the moment and not with those of a day that is past and gone.

Henry L. Gantt, one of the great pioneers in the management movement, once said to me: "The ultimate object of everything we do in industrial engineering is to enable us to set tasks"; that is, to establish a definite daily accomplishment for each and every worker. The daily check on the causes of failure to perform such predetermined tasks has come to be regarded as perhaps the most exacting test of good shop technique.

In the intervening years since Gantt made his remark we have come to recognize that the accomplishment of a predetermined task by an individual worker or by any number of individual workers is but a part of the whole problem of effective manufacturing. For if the individual workers are to have the opportunity to work at all, management must concern itself with many matters not directly related to the individual task. And so a much broader generalization, it seems to me, would be to the effect that everything we do—or should do—in industry must lead in the direction of affording increasingly steady employment for the entire body of workers. So the following discussion is a study of chronic unemployment rather than its more acute phases, which we are at the moment experiencing.

It will be only as we study the every-day and all-the-year-round variety of unemployment, and learn to cope with it, that we shall be able to prevent or at least to minimize the effects of these great waves of unemployment which we have come to look upon as necessarily associated with periods of business depression. My purpose, then, is: (1) to direct attention toward what I take it will come to be recognized as the more important causes of unemployment in a well ordered industrial society; (2) to localize responsibility for the reduction of the unemployment factor; and (3) more especially to advocate the development of increasingly precise methods of measuring the various phenomena we class under the general head of unemployment.

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[1] A paper presented at the Cleveland, O., meeting of the Taylor Society, May 19, 1921.

[2] Consulting Engineer, Philadelphia, Pa.

Assuming that the proper length of the work day has been determined, employment for the individual or the group or the community as a whole is measured by the amount of time actually occupied in production work. The unemployment factor, then, is the percentage by which this falls short of the theoretical maximum. All current practice encourages another point of view—that the test of employment is being on somebody's payroll. Under such a concept, if every available worker were actually on someone's payroll there would be no unemployment, which is of course absurd.

In approaching any large national problem good American practice suggests that we first seek some method of localizing it. So to bring this problem of unemployment within the range of our individual industrial hearthstones, so to speak, I have divided its treatment into two parts:

(a) Unemployment *within* employment; and

(b) Unemployment *without* employment;

the former being the employment of men and women who, technically at least, have jobs—those who are considered or consider themselves the employees of a given plant.

It is becoming the union policy to have available work apportioned among the employees rather than have some laid off or discharged in order that the rest may work full time. The Amalgamated Clothing Workers do not consider lack of work a sufficient cause for discharge. Within the last few months one clothing establishment employing over 2,000 people was working the entire staff less than one day a week. Even with work at this low ebb the effort on the part of the union to hold the employer to responsibility for employment was in no way relaxed. We saw something of the same attitude on the part of the employees of Baldwin Locomotive Works—a non-union plant—when early in 1914 a normal staff of 19,000 had been reduced to 4,000 working part time. The unemployment was continued so long as to cause great destitution. But even in homes where essential furniture like chairs and beds had been disposed of, the workers still considered themselves to be Baldwin employees. This feeling was so strong in many instances as to preclude any thought of looking for employment elsewhere.

Of course a worker may "have a job" in the foregoing sense and yet obviously not be participating at all in the wage distribution, or if participating, then not to a normal extent and perhaps not fully occupied during the period of such participation. Under our definition of unemployment be it remembered we included all varieties of waiting time whether paid for by the employer or not. It all represents an economic waste.

My own impression is that the total of "Unemployment without employment," i. e., the unemployment of what may be called jobless men, represents a relatively small percentage of the total. In some industries and especially in good times, it may easily represent an almost negligible part of the total unemployment. If this assumption proves even relatively near the truth, it will pay us to devote our most painstaking attention to the unemployment of men and women who can, very broadly speaking, be said to have jobs.

And of course if we can assume that ninety per cent, say, of all the employment in the world is that suffered—or enjoyed—by those "with jobs", we have localized the responsibility in the first instance at least within the area of the individual plant. And every employer is cited at the bar of public opinion to show cause why he is not guilty of contributory negligence in adding to the sum total of unemployment. In other words the burden of proof is on every employer who lays any claim to industrial leadership to show that he has availed himself of every possible device for providing steady employment.

But *self-interest* will more and more move manufacturers to undertake the detailed study of the unemployment problem as it becomes recognized that general industrial effectiveness, and more especially constantly lowering costs, are altogether inconsistent with intermittency of employment.

It would certainly be most unfortunate if there were any warrant for feeling that in this matter we were like rudderless ships on unknown and boisterous seas. And yet this appears to be the attitude most commonly held. The moment the subject of unemployment is mentioned we are apt to drift off into a more or less loose discussion of the possible influence of exchange, the tariff, the disorganization due to a change from a seller's to a buyer's market, styles, and seasonal demand, through all of which we are supposed to be relieved of our individual responsibility. This is frequently little more than a smoke screen to cover up either our lack of knowledge or a purposeful avoidance of responsibility. If what has already been done in this field has not proven that reasonably steady employment is possible of attainment for most industrial establishments, it at least points strongly in that direction. This paper is based on the assumption that members of this Society are acquainted with the accomplishments in the matter of affording steady employment of such concerns as the McElwain Shoe Co., the Plimpton Press, the Clothcraft Shops and the Dennison Manufacturing Co. But before the average manufacturer can make use of the experience of these concerns there is required a detailed analysis of the causes of his own unemployment.

Before we get very far in the scientific study of any subject we discover the need for some means of making measurements. So it is in the study of unemployment, and of more immediate interest in this study of "unemployment within employment." The moment we undertake the analysis of our own contribution to the total distress, we discover that "we need some formula or expression or device by which we can measure the amount of unemployment time of those who have jobs. Such a mechanism will enable us to rate the performance of individual employers in this respect, to evaluate the results achieved in different industries in providing steady work and even to contrast the experience of different communities in this matter. In applying this test we should be able to determine the record made in any given period of time—a day, a week, a month, a season or a year. The formula should be so exact as to include layoffs of a few moments or a few hours as well as of days and of weeks.[1]" Such a measure as the one proposed should be so broadly conceived as to be applicable to a given room or a department of a single industrial establishment, or to the plant as a whole, to regional divisions of an industry or to the industry throughout the nation, to geographical areas including all industries, and to the nation at large. We seek a method which is both reasonably exact and capable of being developed in the direction of even greater exactitude. But to be broadly useful the method must be one that is as readily simplified to meet the conditions found in most small concerns, or expanded to meet the necessities of our more highly organized industrial establishments. For the lack of a more descriptive title I suggest we call this factor—this measuring stick for unemployment within employment—the "Unemployment Score." Such "Unemployment Score," it will be understood, is the percentage by which the actual employment given an individual or group compares to the theoretically possible maximum.

It seems desirable to point out the absolute dissimilarity between labor turnover[2] and the "Unemployment Score." An unnumbered bulletin of the Bureau of Labor Statistics on the "Standard Definition of Labor Turnover and Methods of Computing the Percentage of Labor Turnover," says:

> Labor turnover for any period consists of the number of separations from service during that period. Separations include all quits, discharges, and layoffs, for any reason whatsoever.
>
> The percentage of labor turnover for any period considered is the ratio of the total number of separations during the period to the average number of employees on the force report during that period. The force report gives the number of men actually working each day as shown by attendance records.

In the ten or fifteen years of its use this term "labor-turnover" has of course achieved some degree of definition. But even so it is a crude unit of measurement with not much significance in a *well run* establishment. A study of the definition will show that its relation to the proposed Unemployment-within-Employment factor or "Unemployment Score" proposed in this paper, is at best indirect.

The usefulness of such a factor or "score" will be limited unless it is arrived at as the summary of factors measuring contributary causes each in turn build up in like manner. The process should be capable of being carried to any useful degree of subdivision. Let me illustrate this broadly. Assume that the possible theoretical total of working hours for those engaged in a given building last week was 1,000 units of production time. Things ran unusually smoothly, material was delivered on schedule, there were no labor troubles, and the workers were actually engaged during 920 units of production time. The unemployment is of course the difference between the theoretical and the actual or 80 units of production time. Under our proposal the "Unemployment Score" will be eight per cent.

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[1] "Unemployment within Employment," in *American Federationist,* November, 1919.

[2] The educational value of the term "Labor-turnover" in calling attention to the waste involved in frequent changes of employees has been very great. It can also be said that "By appreciating the human consequences of high labor turnover, organized labor has come to see a practical value to wage earners through better labor administration policies." *Extracted from a letter by a far-sighted and splendidly disinterested leader of labor.*

We can take the figures on that same building for all of last year, and assuming a result not so favorable, we can take 50,000 units as the theoretical maximum for the entire year of which not more than 30,000 were actually accomplished. Then the "Unemployment Score" would be forty per cent. Under the proposed plan it must be possible to subdivide this percentage indefinitely. Thus the major causes may be rated as follows:

	Per cent
Absenteeism	5
Lack of Materials	10
Bad weather	4
Strikes	10
Scattering	11
Total	40

Any such approach to the study of unemployment involves some assumptions which, while not current, seem to be fully in line with our probable industrial development. For instance, it appears to be altogether in the interest of a higher qualitative production that much more importance should attach to the separation of the individual worker from a given industrial unit, than attaches to his joining it. A mistake made in taking on a given worker may always be "rectified" by a discharge before the end of the trial period. This is the purpose of the trial engagement. But once the worker has been finally accepted and made a part of the organization, he must be held much more tenaciously than is our common practice. This is not because of any ownership to the title of the job, but simply because if the worker has been carefully selected at the start, well-trained in his specific duties and properly oriented in the organization, his leave taking might be a matter of financial and human concern. In the long run, however, we cannot hold people for whom we do not provide work. So we pass to the concept that it may be just as bad to take more work than our "regular force" can perform as it is to fail to secure enough work to keep that "regular force" busy.

It is the testimony of the best managers the world over that, as we learn to carry on a given class of work in better fashion, the percentage of skilled workers increases. In fact, there is an abundance of evidence supporting the theory that when industry becomes truly scientific there will be no place for the unskilled. Hence we can safely conclude that the better the management the greater will be the financial sacrifice necessarily associated with the lay-offs and dismissals.

I believe we have now arrived at the time when the manufacturers who are to be the most prosperous in the long run will definitely decide on the size of force required and hold rather tenaciously to it. In almost every case this will mean a force smaller than the one formerly employed. The better methods involved in this decision to give steady employment to those employed almost invariably means an ultimate reduction in the normal force. Every effort should be made to effect this reduction gradually through normal separations and not by "firing" anybody. While it may be "hard doctrine," I am convinced that it is almost always a mistake to discharge for "lack of work."

Another idea which, while not current, nevertheless appears to be inherent in effective manufacturing, suggests that idleness on the part of piece workers has as decided an effect on costs as idleness anywhere else. The employer does not appear to pay in any way for this type of idleness simply because he does not pay in direct wages. But he pays in unnecessarily high piece rates and in other more direct ways. In an economic sense all idleness during predetermined hours of work is waste. Important as it is from a manufacturing standpoint to keep machines busy, it is much more so to keep the workers busy. Viewed from this angle a check on man-hours becomes altogether as important as a check on machine-hours. Our tangible investment in machines logically makes machine idleness a high crime. As we come to realize the price which has to be paid for a plant morale under which goods can be manufactured at lowest cost, more effort will be put into guarding against workers' idleness.

If these "Unemployment Scores" are to have the largest social significance and be fully effective as a guide to operating policies, lost time of every character and description must be included in the percentages, especially at the start. I recall, on a visit some years ago to an establishment which had just introduced so-called "Industrial Democracy," that a large number of the employees throughout the plant had obviously nothing to do. It developed that as a feature of the new order a promise of continuous employment had been made. The firm shortly thereafter experienced difficulty in getting an adequate supply of their raw material. Hence the people idle at their work-places. Continuous employment comes as the result of planning and good management. It cannot be had by the issuing of an order.

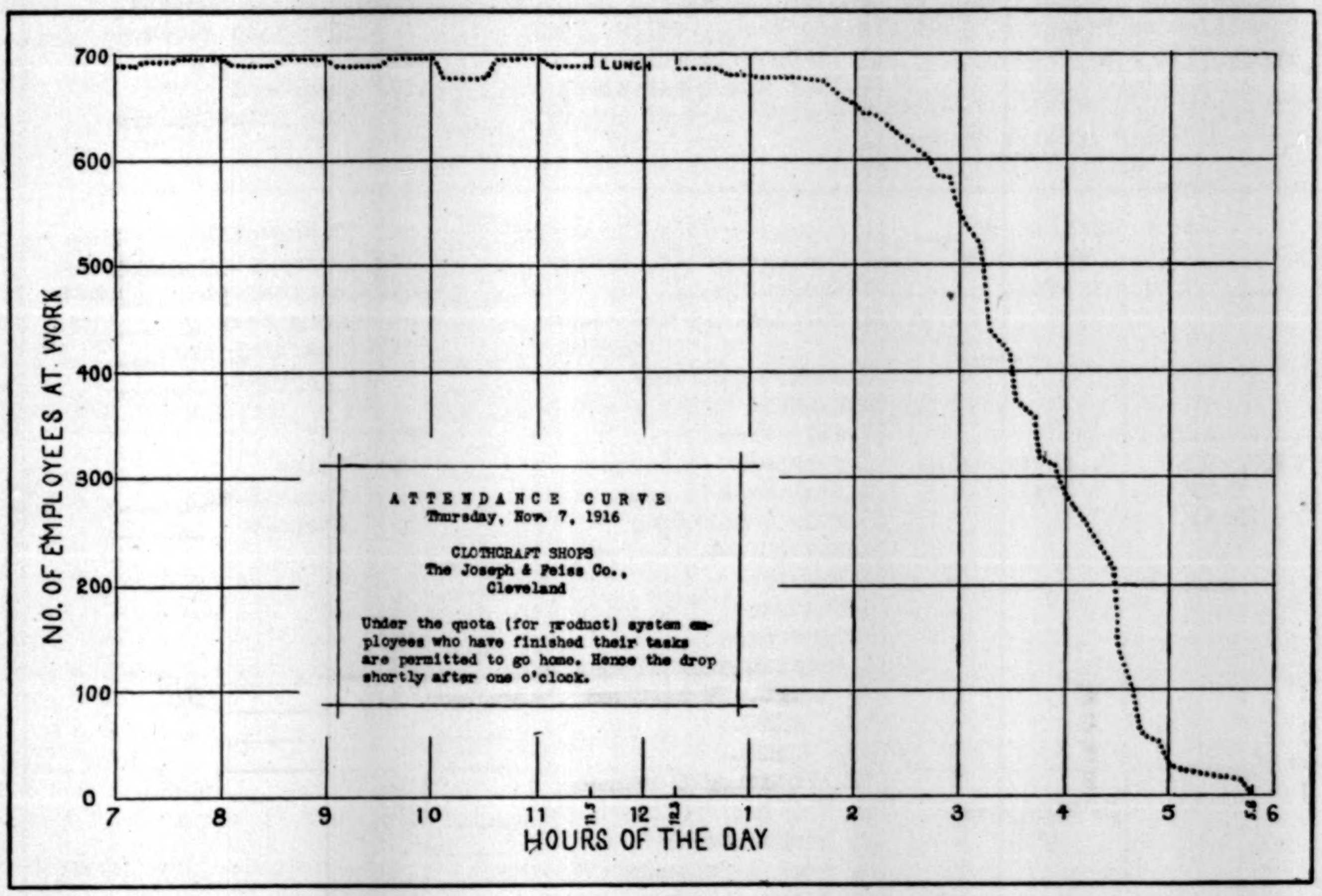
On the other hand, there are varieties of unemployment which result directly from a high type of management—I almost am tempted to say the highest type—such, for instance, as found at the Clothcraft

Shops. Figure 1 shows a typical day's attendance at this plant. Under the quota (for product) system which they have used so successfully, employees having finished their tasks are permitted to go home. Hence the attendance curve begins to drop shortly after one o'clock. Under our definition, the difference between the total of these hours of work and the predetermined hours of work (44 hour week basis) constitutes unemployment. It may be considered a desirable variety. But it should be measured. Without knowing definitely its extent, even an astute manager can not know whether its obvious advantages are otherwise offset.

I do not want to multiply hypothetical illustrations, but to convey a more detailed idea of the picture which a fully developed "Unemployment Score" might give, let us assume that a given group of workers over a given period have been employed sixty-four per cent of the theoretical time, leaving thirty-six per cent as the "Unemployment Score." The unemployed time might be divided as shown in Figure 2. This figure has been so drawn as to afford an instruction card to anyone desiring to take off a score.

Such Unemployment Scores would have an added significance if there were included in the plan some classifying and weighting of the various contributing causes so as to show their importance from a management standpoint. For instance, unemployment occasioned by bad belting practice might be heavily penalized on the ground that it can be absolutely eliminated under proper management. Again some types of "Unemployment within Employment," such as that occasioned by considered vacations, are altogether desirable from a social standpoint. Cognizance of all such considerations should be taken in the weighting scheme. In some instances it may be convenient for the manager to have the unemployment shown, divided as between two or more classes of employees, such as, for instance, between skilled and unskilled.

Assuming that we had "Unemployment Scores" for a number of different branches of the same enterprise or for a number of different plants in the same industry or for typical plants from each of several different industries, it would be possible for those making poor records in any respect to seek the counsel of those securing better results.

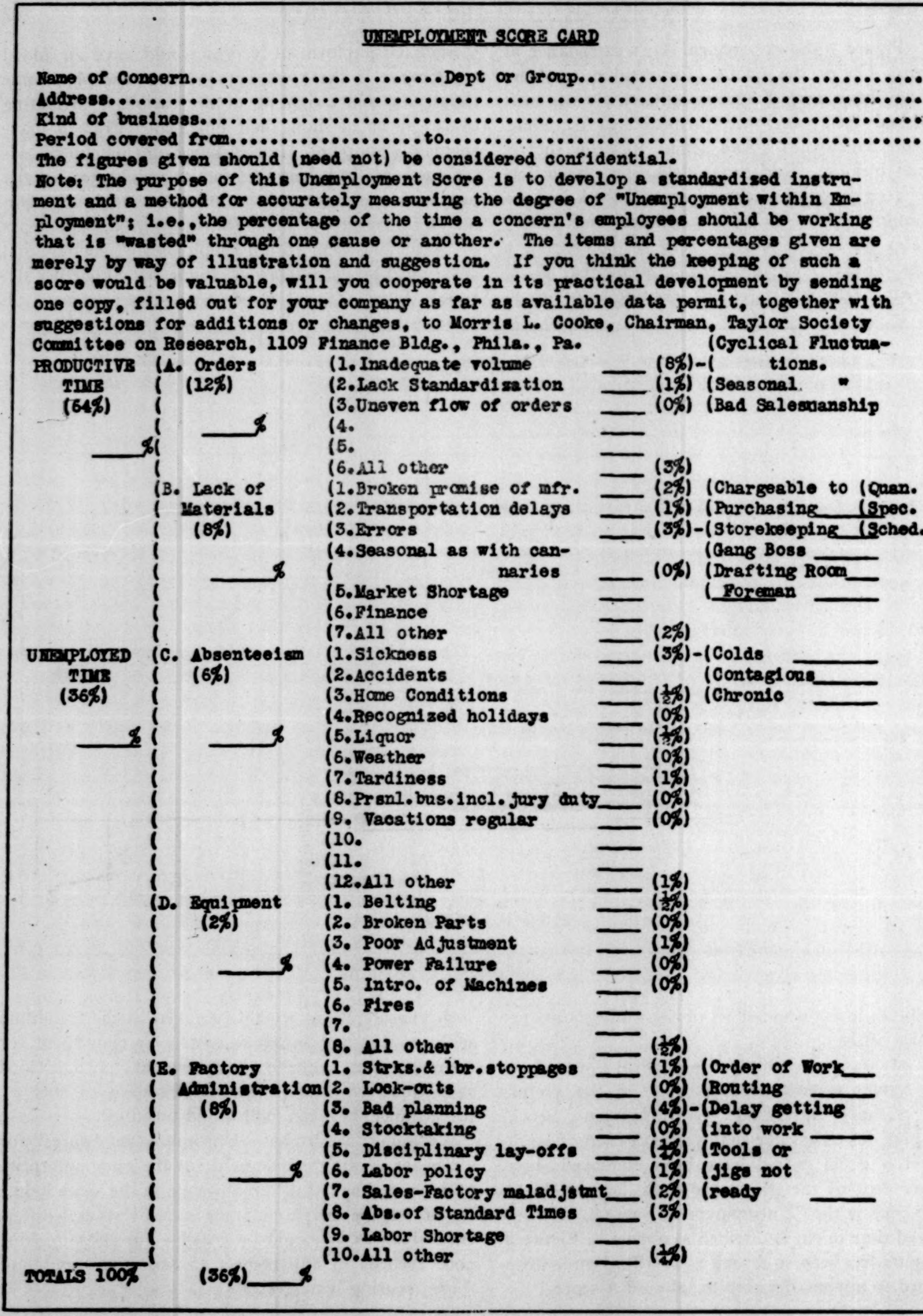


ATTENDANCE CURVE
Thursday, Nov. 7, 1916

CLOTHCRAFT SHOPS
The Joseph & Feiss Co.,
Cleveland

Under the quota (for product) system employees who have finished their tasks are permitted to go home. Hence the drop shortly after one o'clock.

Figure 1



UNEMPLOYMENT SCORE CARD

Name of Concern........................Dept or Group...................................
Address...
Kind of business..
Period covered from..................to...
The figures given should (need not) be considered confidential.

Note: The purpose of this Unemployment Score is to develop a standardized instrument and a method for accurately measuring the degree of "Unemployment within Employment"; i.e., the percentage of the time a concern's employees should be working that is "wasted" through one cause or another. The items and percentages given are merely by way of illustration and suggestion. If you think the keeping of such a score would be valuable, will you cooperate in its practical development by sending one copy, filled out for your company as far as available data permit, together with suggestions for additions or changes, to Morris L. Cooke, Chairman, Taylor Society Committee on Research, 1109 Finance Bldg., Phila., Pa.

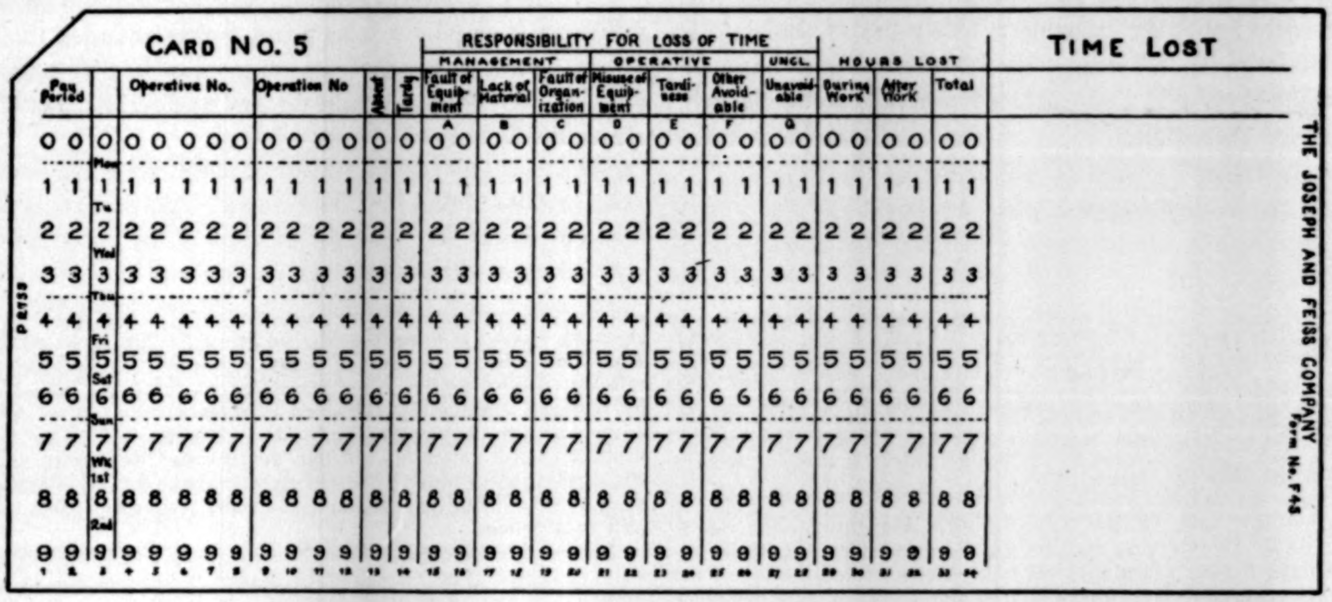
PRODUCTIVE	(A. Orders	(1. Inadequate volume	____	(8%)-	(Cyclical Fluctuations.
TIME	((12%)	(2. Lack Standardization	____	(1%)	(Seasonal "
(64%)	(	(3. Uneven flow of orders	____	(0%)	(Bad Salesmanship
	(____%	(4.	____		
____%	(	(5.	____		
	(	(6. All other	____	(3%)	
	(B. Lack of	(1. Broken promise of mfr.	____	(2%)	(Chargeable to (Quan.
	(Materials	(2. Transportation delays	____	(1%)	(Purchasing ____ (Spec.
	((8%)	(3. Errors	____	(3%)-	(Storekeeping ____ (Sched.
	(	(4. Seasonal as with can-			(Gang Boss ____
	(____%	(naries	____	(0%)	(Drafting Room ____
	(	(5. Market Shortage	____		(Foreman ____
	(	(6. Finance	____		
	(	(7. All other	____	(2%)	
UNEMPLOYED	(C. Absenteeism	(1. Sickness	____	(3%)-	(Colds ____
TIME	((6%)	(2. Accidents	____		(Contagious ____
(36%)	(	(3. Home Conditions	____	(½%)	(Chronic ____
	(	(4. Recognized holidays	____	(0%)	
____%	(____%	(5. Liquor	____	(½%)	
	(	(6. Weather	____	(0%)	
	(	(7. Tardiness	____	(1%)	
	(	(8. Prsnl. bus. incl. jury duty	____	(0%)	
	(	(9. Vacations regular	____	(0%)	
	(	(10.	____		
	(	(11.	____		
	(	(12. All other	____	(1%)	
	(D. Equipment	(1. Belting	____	(½%)	
	((2%)	(2. Broken Parts	____	(0%)	
	(	(3. Poor Adjustment	____	(1%)	
	(____%	(4. Power Failure	____	(0%)	
	(	(5. Intro. of Machines	____	(0%)	
	(	(6. Fires	____		
	(	(7.	____		
	(	(8. All other	____	(½%)	
	(E. Factory	(1. Strks. & lbr. stoppages	____	(1%)	(Order of Work ____
	(Administration	(2. Lock-outs	____	(0%)	(Routing ____
	((8%)	(3. Bad planning	____	(4%)-	(Delay getting
	(	(4. Stocktaking	____	(0%)	(into work ____
	(	(5. Disciplinary lay-offs	____	(½%)	(Tools or
	(____%	(6. Labor policy	____	(1%)	(jigs not
	(	(7. Sales-Factory maladjstmt	____	(2%)	(ready ____
	(	(8. Abs. of Standard Times	____	(3%)	
	(	(9. Labor Shortage	____		
____	(	(10. All other	____	(½%)	
TOTALS 100%	(36%) ____%				

Figure 2

Until we have developed a generally recognized method of taking off "Unemployment Scores" each employer will have to make for himself certain assumptions and adopt tentative rules. But a very little experimentation in any well-run establishment will make data now being regularly collected available for this purpose. The "Unemployment Score" is nothing more than a reassembling of data usually available through methods current in well-run plants. It would appear that the expense involved in collating these figures would be trifling, especially in those plants where individual job-tickets are used as a part of the wage system. It is suggested that a working result will be expedited by providing at the start a heading "Unassigned" into which can be thrown all items of "Unemployment within Employment" the proper classification of which may be in doubt.

Figure 3 is a card which has been prepared at the Clothcraft Shops to follow up lost time by means of an electrical tabulating machine. It is a splendid step in the direction of securing the data from which "Unemployment Scores" are made.

We approach nearer and nearer the time when propositions for unemployment insurance must be seriously entertained in this country. The development of a satisfactory scheme for measuring and accurately analyzing unemployment will certainly facilitate the operation of such plans. It will remove what appears to be the strongest argument against unemployment insurance at the present time, i. e., a lack of information as to its real causes and our almost complete inability to localize and pro-rate responsibility for it. Under the proposed Wisconsin law a manufacturer's previous record in affording steady employment determines the rate he pays. This affords a strong incentive for learning how to provide steady employment before such a law goes into effect. Of course the most important service which unemployment insurance can render will grow out of the pressure it will exert on management to reduce unemployment to a minimum. This statement is warranted through our experience with workmen's compensation acts. The relief afforded injured workmen and their families, important as it has been, is nothing compared with the results obtained in the matter of accident prevention. As significant of possible future development in this matter it is interesting to note the experiment of the Dennison Manufacturing Company in setting up their own unemployment insurance reserve.



CARD No. 5

TIME LOST

						RESPONSIBILITY FOR LOSS OF TIME							HOURS LOST		
						MANAGEMENT			OPERATIVE			UNCL.			
Pay Period		Operative No.	Operation No	Absent	Tardy	Fault of Equipment A	Lack of Material B	Fault of Organization C	Misuse of Equipment D	Tardiness E	Other Avoidable F	Unavoidable G	During Work	After Work	Total
0 0	0	0 0 0 0 0	0 0 0 0	0	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
1 1	Mon 1	1 1 1 1 1	1 1 1 1	1	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
2 2	Tu 2	2 2 2 2 2	2 2 2 2	2	2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
3 3	Wed 3	3 3 3 3 3	3 3 3 3	3	3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	Thu 4	4 4 4 4 4	4 4 4 4	4	4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	Fri 5	5 5 5 5 5	5 5 5 5	5	5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	Sat 6	6 6 6 6 6	6 6 6 6	6	6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	Sun 7	7 7 7 7 7	7 7 7 7	7	7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	Wk 1st 8	8 8 8 8 8	8 8 8 8	8	8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	2nd 9	9 9 9 9 9	9 9 9 9	9	9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9
1 2	3	4 5 6 7 8	9 10 11 12	13	14	15 16	17 18	19 20	21 22	23 24	25 26	27 28	29 30	31 32	33 34

PE130

THE JOSEPH AND FEISS COMPANY
Form No. F48

Figure 3

It is altogether certain that through this kind of study of unemployment we are going to expose certain weaknesses in our present manufacturing methods. For instance, it will be properly demonstrated that steady volume both for the plant as a whole and by departments is equally desirable from the two standpoints of profits and of steady employment.[1] It seems highly probable if this could be demonstrated by each factory for itself that some of the more obvious expedients by which steady volume is encouraged would be introduced.

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[1] "Organizing for Work," by Henry L. Gantt, Harcourt, Brace & Howe.

Perhaps an even better illustration of the kind of facts which will be developed by a scientific analysis and tabulation of unemployment data will be the effect of jobbing or contract work on steadiness of employment. It should be obvious that it is much more difficult to provide an even flow of work when one is doing it measurably under the specifications or on the demand of customers rather than on one's own detailed plans. But the weight of this handicap will not be revealed until we are in a position to compare the unemployment scores of establishments on a repetitive basis with those still operating on a contractual or jobbing basis. Getting away from jobbing and into repetitive manufacturing constitutes one of the master-strokes lying ready to the hand of American industry, whereby we can secure not only a large reduction in costs but make possible a vastly better showing as to continuity of employment. Our slogan must be "make-then-sell"; our present practice is too largely to "sell-then-make."

For the development of any such mechanism as the "Unemployment Score" we must depend as usual upon the best-managed plants. But it is also true that the most interesting and helpful "scores" will come from those plants which have only started on the road to good management. It should be obvious that in the "Scores" made by the best plants many factors common to most plants will not appear at all, simply because they have been eliminated. I rather think that the "Score" now being made by a few model plants is from eight to ten per cent, the average achieved by representative American plants is probably not far from twenty-five per cent, while plants falling to forty per cent and even fifty per cent cannot be considered exceptional.

It is good Americanism to face the facts. In my opinion the employer who wants a master index to the effectiveness of his management—one that includes a maximum of facts—would do well to develop his "Unemployment Score."

ABSTRACT of remarks of A. B. Rich, Assistant Works Manager, Dennison Manufacturing Company, Framingham, Mass., at the first meeting of the New England Section of the Taylor Society—Boston, May 6, 1921:

We call our (Sales Engineering) department the Merchandise Department and its organization was begun by us perhaps fifteen years ago.

In general it is responsible for the research and development of the various goods we produce. It has to put out new lines and investigate the extent of the demand for the commodity and watch the quality as far as our sales organization goes. All details concerning manufacturing cost and keeping constantly alive to competition belong to this department. It has final approval of materials, designs and put-ups and placing of orders for all the goods made for stock. It has to co-operate with the manufacturing department in the determination of the facilities necessary for the production of its goods. It carries on constant inspection as to quality and quantity. In the general field of marketing, this department has to be responisble for what we call sales promotion, the research and development of this company's production through missionary work. In addition to this it is responsible for a large amount of sales promotion in the way of talking to our regular sales force, by coaching the salesmen, by lectures, conducting salesmen courses and by correspondence with the salesmen; and also what we call sales promotion in the education of our dealers and their consumers of our line of goods. Also in co-operation with the factory end of our business we contribute to publicity, price lists and catalogues.

The placing of orders for all stock goods is in this department. It involves an investigation of the demand—of the future and the immediate outlook. It checks up warehouse reports and periodic sales reports. It gets out master sales schedules. It censors orders, which means determining what varied lines of goods we will make. This division is responsible for withdrawing of goods from sales. It determines when goods shall be dropped due to lack of market, goods, materials, or for other desirable reasons. It is responsible for the final disposition of any dropped goods. It is responsible for pricing and discount policy. It is making a constant study of these problems and of organization of sales master sheets, all of which means we are months ahead of our production and consequently it means the formation of our actions on a basis of fact, or as near to fact as we can possibly arrive at.

HOW AN UNSTABILIZED DOLLAR INTERFERES WITH EFFICIENT MANAGEMENT[1]

By IRVING FISHER[2]

I WAS reading last night some biographical sketches of Mr. Taylor, and I came across this quotation: "The dollar is the final term in almost every equation which arises in the practice of engineering." Therefore it is essential that the dollar should be a dependable unit in order to help solve these equations.

Confirming what your president has so well said, I would say that we should look at the problem of efficiency not only with a microscope but also with a telescope; not only in our own individual spheres, intensively, but in its broader aspects. If we do not, we are constantly having our predictions thrown out by something that we haven't foreseen. You know how this terrible war threw out of kilter almost all of the arrangements that we thought we had fixed in times of peace.

There are, to me, four great general subjects of efficiency far transcending the technique in individual business. You are trying to eliminate waste, and you can accomplish wonders—as Mr. Taylor and his successors have proven—in direct, technical specific ways. But all the economy that could be effected by the Taylor Society in all the factories of the world wouldn't save the waste that comes from any one of these four causes.

Bad heredity causes the greatest waste, I believe. In a village in Switzerland some far-sighted people decided to try to get rid of one of the great curses of inefficiency, cretinism, a loathsome form of helpless human degenerates common in Switzerland and propagating its kind from generation to generation. By establishing two institutions, one for men and another for women, and by care and attention they have freed themselves of this tremendous curse in that vicinity. This is an example of what the science of eugenics can accomplish.

Secondly, there is the great waste from disease. One of the hardheaded business men of this city, Mr. Harold A. Ley, President of the Fred T. Ley & Co., with my colleague, Ex-president Taft, myself and others, founded the Life Extension Institute to help diminish the death rate. I believe that in its brief career it has saved to working power in this country untold millions of dollars.

Thirdly, there is the waste of war. One of your great men, Mr. Hoover, will, I hope, help solve the problem of eliminating that waste in the next administration.

And finally, there is our unstable dollar. These four *general* wastes, I think, are worthy of the attention of every engineer, and this evening I am going to speak of that one of these four which falls specifically within my own department of investigation.

My old master of economics, Prof. Summer, used to say: "When you have a social situation to deal with, divide your study of it under four heads: First; What is it? Second; Why is it? Third; What of it? and fourth; What are you going to do about it? And so, tonight, I shall consider the dollar in that way: First; What are the facts? Second; What are the causes? Third; What are the evils? and fourth; What are the remedies?

As the subject is worded, it would seem as though I am expected tonight to impress upon you the evils; and I shall, for I believe that once the evils are appreciated, the remedies will be found, if they have not been found already.

First, as to the facts. The fact is that our dollar is unstable, and this is the same thing as saying that the general level of prices is unstable. When we say that prices and the cost of living are double today what they were before the war, this is the same thing as saying that the dollar will buy half as much today as it did before the war. But I much prefer the latter to the former method of statement, because it brings into the center of consciousness the dollar, which otherwise is apt to escape notice.

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[1] An address at the Springfield, Mass., meeting of the Taylor Society, Feb. 24, 1921.

[2] Professor of Political Economy, Yale University.

We now have a method of measuring the purchasing power of the dollar—in other words, of measuring changes in the general level of prices. This method of measuring is called the index number. An index number is an average percentage figure which shows the average change in prices. If since last month sugar has risen 4 per cent and wheat has risen 10 per cent, then these two, on the average, have risen 7 per cent. By taking last month as 100 per cent as a basis of comparison, the index number today is 107 per cent. In this reckoning we count the sugar and the wheat as of equal importance. But if we find in trade twice as much value of wheat is exchanged as of sugar, we can put a finer point on this average by counting the wheat twice and the sugar once, so as to take an average not of the two figures 4 and 10, but of the three figures 4, 10 and 10, making an average of 8, so that the index number, instead of being 107, is 108. Or, the other way around, if sugar is twice as important as wheat, then we count the 4 twice, taking an average of 4, 4 and 10, making 6, so that the index number is 106. But you notice that you get very much the same results—106, 107 and 108—whichever of these three methods of weighting we employ. And it is found, as a matter of fact, that almost all index numbers yield similar results, even index numbers which are demonstrably unscientific. We now have index numbers in general use, whereas when I began the study of economics they were looked at askance. An index number is, if properly constructed, one of the most precise instruments of statistics, giving results dependable within one-half of one per cent.

By means of index numbers we know that between 1789 and 1809 prices doubled. Between 1809 and 1849 prices receded again to lower than the point from which they started, i. e., were more than cut in half. Between 1849 and 1873 prices rose, on the average, about 50 per cent. Between 1873 and 1896 prices in gold standard countries fell about 25 per cent. Between 1896 and 1914, the year of the outbreak of the great war, prices in this country rose 50 per cent; in England 35 per cent; in Canada 50 per cent; and in other countries of Europe about midway between the English and the American rise. Between 1914, the beginning of the war, and 1918, the end of the war, prices in this country doubled. In England they tripled; in Germany they were multiplied by ten. Between 1918, the time of the armistice, and last summer, prices went up about 25 per cent, and since last summer they have dropped about 30 per cent. In terms of the purchasing power of the dollar we would express all these changes the other way round, and say that the pound sterling between 1789 and 1809 was cut in two. Between 1809 and 1849 the pound sterling was more than doubled. Between 1849 and 1873 the pound sterling was cut down two-thirds, and so on to the present time.

Evidently, the whole history is one of constant change, and I might go back of these dates, although we haven't as accurate index figures preceding 1782. The fact is that our yardstick of commerce is made of rubber.

Now, secondly, why is it that our dollar is constantly changing, Most people have taken it as "an act of God," as something inevitable, overlooking the dollar and thinking only of the commodities, as though it were altogether a matter of supply and demand of sugar and wheat, and ignoring the vast supply and demand of money and its basis, gold. In my book I have enumerated over forty alleged causes of increased cost of living. All are substantially false, because they look only on one side of the market, the side of the market that varies the least, the goods side, ignoring the money side. In any trade you always have goods on one side and money on the other.

Now if a man from Mars, knowing nothing of economics, were asked which he though were the most probable explanation of these mysterious rises and falls, and we inquired why during the war substantially a thousand different commodities rose on the average 100 per cent—whether it was because of a thousand individual causes or whether it was because of one cause—he would unhesitatingly say, one cause. He might say money; he might say war; or he might say money in relation to the war, which would be nearest the truth. But even before the war (to eliminate the war) this man from Mars would say that from 1896 to 1914 the chances were that it was not because a thousand things had changed so much as because one thing had changed—namely, money.

Now it was this same simple argument of probability that led Copernicus to that great revolution of thought which now is the possession of every schoolboy. Yet each of us as a child, before we went to school, had the impression that the sun really rises and sets once in twenty-four hours, and that the stars revolve around this *terra firma* on which we stand. Copernicus found great difficulty. It really took centuries to overcome the prejudices and bigotry which retained the old idea of immobility of the earth. But now we recognize that the stars do not, once in every twenty-four hours, revolve around us, but their appearing to do so is explained by the opposite rotation of the earth on its axis. That does not mean that stars do not move; on the contrary, we know that they do. So when I say that the real explanation of price changes must be sought in money and not in goods, I do not mean to deny that individually the goods are in constant motion; I mean that most of the apparent motion that we see is not theirs but that of the gyrating dollar on which we stand.

But I do not wish to stop at a mere appeal to probability. Specific statistics will confirm the conclusion. You can not find any justification for the notion that goods have been progressively getting scarce since 1896, which you would need to assume if you could blame the rise in prices on goods.

Professor Stewart, who is here this evening, and several other investigators who have been making a careful study of physical production, have reached conclusions that are quite at variance with any such theory; and many other lines of statistics converge to the same conclusion, so that you can not explain the rise of prices by scarcity of goods. But you can by abundance of money.

Then if we compare various countries that have the same kind of money, we shall find that they have the same kind of price movement. If you should plot on a blackboard the price movements of Canada and the United States, the curves would look so much alike that you could not tell them apart, and you would not know which is which unless you look at them very closely. And we found a close resemblance in curves of prices before the war in such standard countries as the United States, Canada, England, France, Germany, Austria, Italy, Holland, Spain, Russia, Japan and the Scandinavian countries; and since the war we find a great disparity in the price movements. and also a great disparity in the kinds of money. Wherever you find the same kind of money, you will find very much the same price levels. Take the statistics for India, Japan and China for the period 1873 to 1896, and you will notice there was an approximation to agreement.

But the movement in the gold countries and the movement in the silver countries did not agree.

Moreover, the disagreement in these movements corresponded to the disagreement in the monies. Between 1873 and 1896 while prices in gold standard countries fell, prices in silver standard countries went up about the same amount. They diverged between each other about 40 per cent, the one that was lower than the other sinking relatively by about 40 per cent; and we find that silver fell in price about 40 per cent in the Latin markets, and that gold in the Shanghai market rose in inverse ratio.

And so this leads to the observation that the man from Mars could really see what was going on here better than we could, for each of the two parts of the world, gold and silver parts, can understand better what is going on abroad than at home. If you asked any Englishman why it was, in the period of the 90's, that the silver countries showed rising prices, where gold standard countries had fallen, the Englishman would say: "Why, of course, silver has depreciated. Since silver has depreciated the prices in terms of a depreciated currency must go up." But if you ask a Hindoo or Chinese why there was this divergence, he would put it the other way around, and say: "Why, we see gold going up all the time, and therefore it is natural, as the appreciation of the English currency continues, that the level of prices in England should go down."

Sir David Barbou of England, a man who in his younger days participated in establishing the "gold exchange standard" in India, in his very interesting book on The Standard of Value, relates an incident in which an Englishman was talking with a Hindoo merchant. The Englishman referred to the fall of the rupee, as an Englishman naturally would, coming from London, and the Hindoo looked at him with amazement and said: "The fall of the rupee! The fall of the rupee! I never heard of it all through India. I have my agents all around. They have said not a word about it. What can you mean?" Then he said: "You must mean the rise in the pound sterling."

Now these changes are registered in international exchange, and if you want to know the root reason today why the French franc or the German mark have lost their value in terms of our dollar, it is that the franc and mark have lost their value at home in terms of commodities. They go down in the exchange because they have gone down at home. But our dollar has also gone down, so that you can not be satisfied by measuring, through the international exchanges, merely the *relative* depreciation, but must try to get closer to the *absolute* change by which each currency is measured in terms of commodities—its real purchasing power.

And we find that wherever there is inflation, wherever there is change in the quantity of money or substitutes for money, we find that the purchasing power of money goes down, and *vice versa*. Therefore, with the great outpouring of gold from the mines of California in 1849 and in Australia, prices throughout the world went up. The same thing happened after the discovery in the 90's of the cyanide process and the discovery of gold in Cripple Creek. Prices of goods went up. In the 16th century when the precious metals were imported into Europe from the New World, prices went up in Spain, and then in Holland and other countries to which Spain transferred these metals in trade.

During the war the great master key for the tremendous price revolution, of which we are still sensible, was inflation. There are three kinds of inflation, all three of which we experienced in this country; namely, paper money inflation, bank deposit inflation and the basic inflation of gold itself.

The last of these we experienced first when we imported over a billion dollars of gold, and that was the reason for the great advance in prices before we entered the war at all. Afterwards we expanded the paper currency to match, through the issue of Federal Reserve notes, and we expanded deposit currency by an enormous extension of deposits subject to check.

The efforts to finance the war had a lot to do with all this. One way of financing a war is by what is known as forced loans. During the Revolutionary and Civil War days this was done in the old-fashioned way—running a printing press. In the Civil War we issued the greenbacks, and when we had any bills to pay we simply printed green backs and gave them to the munition makers or soldiers. We said: "Don't ask us to redeem them, but go buy what you need, and tell the people that they must accept them." That was a forced loan. The loan itself was with the munition maker, who furnished the ammunition, and the munition makers simply passed it on, and so it went on from one person to another, and it was generally felt through a universal rise in prices.

During the Revolution we did the same thing—paid our continental soldiers with continental money. We still have a malodorous memory of the depreciation that was caused by that unsound method of financing a war when we use the expression, "It is not worth a continental." During the early days of the recent war, even before the Bolshevists got control Russia had issued more paper money, face value, than there was money in the rest of the world put together.

And in the rest of the world, leaving out Russia, there was a three-fold expansion of money, including mostly paper money, and a three-fold expansion of bank credit, and on the average, I think it is fair to say—although we haven't all the statistics—that prices throughout the world rose about three-fold.

So we find plenty of evidence that money is at the base of these price changes. So much for the second point.

Now we come to the third point: What of it? It would seem if we pay twice as much money today for an object, merely because we have twice as much money with which to pay, that we are just exactly where we were before; that there is no evil; that it is merely a matter of bookkeeping; and that if we have a fifty-cent dollar and our incomes increase in proportion to the decrease in value of the dollar, we are left exactly where we were before. If it were true that our incomes were expanded in exactly the same ratio as prices, we *would* be exactly where we were before, and the high cost of living, of which we complained so long, would be purely nominal. And yet we know that that is not so; it never can happen that all our incomes will so adjust themselves. It can not happen, because the *contracts* and quasi-contracts by which we tie one point of time to another can not be so adjusted; it can not happen, because the dollar is the standard for debts, for agreements and arrangements of all sorts, and because that dollar is supposed to be an invariable unit. When it varies and goes back on us, it produces an injustice as between one party and another. When prices are rising and money depreciating, the debtor gains at the expense of the creditor. And when the opposite is true, and prices are falling, the creditor gains at the expense of the debtor.

It might be argued—if it could be so argued—that it is all the same, that what one person loses another person gains; but that would contradict our whole idea of efficiency. On that basis you could argue that burglary does not make any difference in society; that what I lose the burglar gains!

Let us take a few examples, and we will see what a tremendous evil this change in the purchasing power of the dollar is. Take the case of the servant girl or clerk who put $100 in the savings bank in 1896 and let it accumulate at three per cent interest. Today she can get out $200, which is the $100 accumulated at compound interest. First, she congratulates herself on her foresight and thrift, and she says. "See what I have gained. I have gained $100 by waiting all these years, and now I have twice as much as I put in!" But when she turns around to spend, she finds that prices are three times what they were in 1896, so where is the reward of thrift? She has been cheated out of all her interest and some of her principal besides—not by the savings bank, but by the dollar, in terms of which the savings bank was forced to keep her account. Take the case of a widow who was left $100,000 of gild-edge gold bonds in 1896. She has been cutting coupons all this time and living on the results. Has she had an income? No: she has simply been using up her capital. Because of the false value of the dollar she has been betrayed into doing this very thing. The $100,000 today is one-third in true value what the original $100,000 was. In order to keep her capital really unimpaired, she would have had to re-invest out of her "income" something as a sinking fund in order to maintain the same capital value. How much would she have to re-invest? The answer is: *all* of her income—and that would not have been sufficient! She, too, then—although she never figured it that way—has been cheated out of all her income and been betrayed into trenching on her capital, because of the false value of the dollar. Russell Sage and Hetty Green, who made their fortunes by lending at small rates of interest, did so when prices were falling, before 1896. Those who have tried to do so since 1896, though they have gotten up early in the morning and gone to bed late at night, and spent all these years of their lives in mere money lending, have their labor for their pains, and haven't gained a single cent of real value. They are like the girl with her $200, fondly imagining that they were making money, or like Alice in the Looking Glass who had to run as fast as she could to stand still, and even then was slipping backward.

We hear people talking about thrift and advising the working man to save money at interest, and I have often wondered if people realized what a mockery it really is. If the people knew what was going on, during rising prices thrift would be so discouraged that we could not get anybody to save money. We have deluded ourselves by keeping locked up in separate water-tight compartments in our minds the losses and the gains. We say: "We should have made money, only this terrible high cost of living has robbed us of it." But that is the same thing! It is all involved in the dollar itself.

"But," you say, "if it is true that during the period from 1896 to the present time has been this loss, who has gained?" The bondholder is the typical creditor today, and the stockholder is the typical debtor.

Suppose we had in Springfield before the war a concern with $100,000 of bonds and $100,000 of stock, each yielding, we will say, five per cent, so that each year the bond holders were getting $5,000 and the stockholders were getting $5,000 from that concern, which was going along in a normal manner before the war. What is the consequence of the great depreciation of the dollar which the war has brought to that concern? If it is a typical concern, then it should after the war be making, not $10,000 to be distributed between the bondholders and stockholders, but $20,000, because prices had doubled. For the same business at double the prices they should be having $20,000 to distribute between the bondholders and stockholders. But no longer would this sum be distributed in equal parts, because the bondholder is held down to $5,000 by his contract, and the mere fact that the dollars, in terms of which he gets his contract fulfilled, have changed would not be taken into account; so he will draw only his $5,000, leaving, out of the $20,000, $15,000 for the stockholder. Nominally, the bondholder gets the same sum as he did before the war; namely, $5,000. Nominally, the stockholder gets three times what he did before the war; $15,000 instead of $5,000. In terms of real units, however, units of commodities, the bondholder is getting only half the value that he did before the war, and the stockholder instead of three times what he did, is getting one and a half times what he did before the war. In other words, the bondholder is getting fifty per cent less than he used to get; so you now see who has the money. The stockholder has got it away from the bondholder, not by thieving, not on his own account, not by any dishonesty of which he is personally guilty, but through the thievery of the dollar itself, which has picked the pockets of one set of people to the advantage of another set.

I calculate that between 1896 and the present time at least $100,000,000 worth of wealth have been transferred from one set of pockets to another, and millions of dollars of such false transfer is going on all the time.

If prices are falling, of course, it is the opposite way. We remember when prices were falling how the debtor class was excited; how the farmers of the West whose farms were mortgaged were angry and complained of the money lender of Wall Street as sucking the life blood out of agriculture and out of commerce; and it was true, only it wasn't the fault of the creditors personally. These people found their mortgages millstones around their neck growing heavier, while the price of wheat went down and their profits disappeared, and they went bankrupt. That is the sort of thing that produces bankruptcies. Now the public understand this thing only in a vague sort of way. They see that some people are getting rich, while others are getting poor, and they realize that something is wrong, that it is abnormal, and that it is not due to personal fault or virtue, and therefore they are angry and they apply epithets—"profiteers"—to the person who gets rich because he is the winner. If prices are falling they talk about the "bloated bondholder," and in the campaign of 1896 you will remember that that was the cry, the "gold bugs" and "money sharks," the "bloated bondholders" of Wall Street. Now, or at least until recently, when prices were on the up grade, you didn't hear anything about that sort of thing. Bond holding was a very modest thing. We were all bondholders during the war, and it has a good name again. Now it is the "profiteerer" who is the man into whose lap the gain came through the unstable dollar. He couldn't help it.

I know a man, one of the men who want to stabilize the dollar, Mr. Morse, head of the Morse Lumber Company, one of the soundest business men in the city of Rochester, who did not want to have this epithet applied to him, and he actually sought to reduce the price of lumber. This was two or three years ago. And so he tried to sell lumber at lower than the market rate, at what would be a reasonable figure and still give him a profit. What happened? The other lumber merchants tried to and did buy their lumber of him, and they sold it and made a profit themselves. So he, too, became a "profiteer." He simply could not help it. It don't mean that there was no such thing as unreasonable and unnecessary profiteering actually going on. That is going on all the time. But the profiteering which comes with rising prices was an abnormal phenomenon, not due to any special human cussedness during that period, but merely due to the dollar changes.

When this sort of thing happens and people see some people getting enormously rich, and others getting poor at the same time, day by day, it follows that they become angry. And so the second evil that comes from an unstable dollar is social discontent. When people find that they are suffering and hurt and don't know what it is that hurts them, they are irritated and they are bound to hit out and hit something. The wage earner and the salaried man lose their purchasing power, and are among the discontented class. Many of you have the impression that the average earner gained because of the demand for his services and high wages. That is not true. The average wage earner until the last two years, or a year and a half, was losing. And that is always the case in all history when prices rise. Wages are trying to catch a lost train, and are always one train late. The working man resents that. When his money wages have been increased and he goes to the corner grocery and finds that the prices of articles there have risen even more than his wages, he believes somebody has been cheating him. "My employer has been raising my wages," he will say, "but he is in some kind of a game by which he raises the cost of living even more." And that kind of feeling has been intensified enormously by the unstabilized dollar. Socialism has grown enormously because of this unstable dollar.

When I spoke on this subject at New Haven, a distinguished Socialist—whom I will not name—when I was through presented his diagnosis of these troubles, and gave as his chief reason for the high cost of living, "Capitalism." Afterwards he took me off to one side and said, "Professor Fisher, I will tell you, I think you are entirely right in your diagnosis, but we Socialists can not help yielding to the temptation of making hay while the sun shines." He told me that the "high cost of living" was making Socialists in America, and in Germany especially. It had a lot to do with precipitating the war. In order to prevent social war and the consequent overthrow of his throne the Kaiser tried the trick of getting up a war abroad. Now, I do not mean that that is the simple explanation of the war. I am not trying to explain all the events of history by the unstable dollar. But the unstable dollar was a factor. It was also a factor in closing the war also. Major Hadley, a son of President Hadley of Yale, who was stationed in Germany immediately after the war, reported to me that the best theory of the abrupt ending of the war and that sudden collapse of morale among the Germans was just this discontent that I refer to. It was a great mystery to them why some people were getting rich, while the wages of the soldiers were so low that their wives and children were starving. And yet some people were getting rich, and the thought that making money was all the people at home cared about while they themselves were risking their lives, made the soldiers sick and tired and they threw up their jobs. Almost all the great events of history are bound up with the unstable dollar.

So we have evil No. 1, social injustice; evil No. 2, social discontent, including at least the fanning of the flame of Bolshevism. The high cost of living had a lot to do with Bolshevism in Russia. And then there is evil No. 3, social inefficiency, which may interest you in particular. Take the case of my own profession of teaching: teaching inefficiency is one of the fruits of this unstable dollar because teachers' salaries have been slow to adjust themselves to this high cost. Yale College and educational institutions that are endowed have had part of their endowments taken away from them. Yale was given a few years ago a fund of $15,000,000. As a matter of fact that $15,000,000 scarcely offset all the real value that was lost, by the depreciation of the dollar, to the investments of Yale which were in bonds and preferred stock. The teachers, losing their purchasing power, are going out of teaching. In one of the New England states forty per cent have thrown up their jobs. Many of the professors of chemistry in colleges are going into industry, the professors of economics are going into banking and the professors of English and literature are becoming editors of newspapers. Sometimes you will find a janitor of a school getting more than the teacher, because the teachers' salaries are so slow to adjust themselves. Now I am not saying this to ask sympathy for my colleagues, for we are servants of the public. My point is that the public of the next generation is going to get pretty poor teachers as the result of the unstable dollar, and we are going to have poor teachers just at the time we need intellectual leadership and good teaching. We are on the way toward a poorer and poorer set of teachers. The teacher's lot of today is the worst that it has been in forty years, and it may take half a century before this condition is relieved. That is one price we have to pay for our unstable dollar. Again take our civil service; the same inefficiency is apparent there. Look at the postal service. The Patent Office is almost ruined. Most of the men remaining are superannuated. The young men who can get jobs elsewhere have left, and the Patent Office is getting further and further behind in its work. They are trying to get girls to do the work which ought to be the work of specialists. Government employees at Washington are being sifted out and some of the bureaus are suffering from lack of properly trained men; all because of the unstable dollar and the refusal of Congress to make the adjustments necessary. You saw in the press how the members of Parliament are complaining because two hundred pounds does not pay their expenses. There is going to be a tremendous debt to pay of social inefficiency that comes from maladjustment.

In regard to this business cycle of which your president spoke: ***The key to most of the evils of business cycles is the unstable dollar.*** Clement Juglar defined a crisis as the apex of the curve of prices. When you plot the index number, the point at which it suddenly reverses as it did last summer, that is the date of the crisis. Following there come bankruptcies and all the things that come from the sudden appreciation of a dollar after it had been depreciated progressively.

This economic cycle has at first the appearance of prosperity. But it is a false prosperity, due to the alternate depreciation and appreciation of the dollar, ending in a crash. We are lucky that it is today no worse than it is. It would have been a panic but for our Federal Reserve System. It has been a crisis without a panic, but it has been a crisis nevertheless, and it is due to the unstable dollar. The unstable dollar has always had a large part to play. If we had been able to keep an even keel in the general price level, we would not have had this crisis; at any rate, we would not have had any fluctuation that would have been worthy of the name of a crisis. But when in reaction from previous depreciation the dollar suddenly increases in value fifty per cent, this sudden change has the effect of making bankrupts and of making unemployment, and all the other maladjustments with which we are concerned at this moment in business.

So I say, that instead of our being able to look complacently at the dollar change as being a nominal bookkeeping affair, the very fact that we are keeping our books falsely in terms of a varying dollar makes the dollar instability one of the most tremendously big evils with which business has to deal.

Finally, what shall we do about it? We know if the fault is an unstable dollar, the remedy must be a stable dollar. We must do for the dollar what we have done for every other unit. You realize how important every other unit is in efficiency. You could not build a locomotive if you did not have a good unit of length, and a good unit of weight, and get all the fine adjustments correct. And you can not conduct business with any scientific management or with real efficiency and make any real adjustment unless you have a standardized dollar.

There was a time when even the unit of length was as unstable as our dollar is today. The old yard was the girth of a chief of a tribe and was called the gird. Then it was the length of the arm of King Henry I, which was much more exact; then it was the length of a bar of iron kept in the Tower of London; now it is a certain part of a meter, which is a bar in the Bureau of Standards in Paris and a duplicate of which is in the Bureau of Standards in Washington. I visited the vault in which this is kept, and the observer who makes the measures which you use in efficiency engineering, does not go near the glass case in which this bar is kept, but examines it with a telescope across the room, lest the radiated heat of his body should expand the bar, and therefore change the unit, so careful are they to get a unit of exactness. It is scientific to have a unit of length that does not vary appreciably. What would you think of having as a yard stick the girth of the president of the United States? And suppose you had contracts made in the Taft administration! The fluctuation in the length of the yard stick which would be represented by that change of girth from one administration to another, would be just what we have experienced in the dollar, but the change in the dollar is a thousand times as serious as in the case of the yard stick used for measuring cloth.

The dollar enters into all contracts, and not only into trade where there is more or less of a spot cash transaction, but into long time contracts in which dollars of today are exchanged for dollars tomorrow. So I say, that the stabilizing of the dollar is a thousand times as important as stabilizing the physical yard stick which measures length. We have a false dollar. It is not a unit of value at all. It is a relic of the Stone Age. We once used a unit of weight, a stone, without specifying how big it was, simply a "stone." And we reckoned the height of a horse by so many "hands," without specifying whose hand it should be. We have had all kinds of units, but we have now standardized even the bushel basket, the kilo-watt and all the rest; but the dollar is still the dollar of the ancients. It is not a unit of value at all. You can't stabilize any unit until you can measure it. You could not stabilize electrical units until you had a means of measuring; nor the unit of weight until you had the balance for weighing. We have now an index by which we can measure the dollar, and now therefore we ought to adopt a scientific dollar by applying this measure, instead of the unscientific dollar which we have today.

What is a dollar? A dollar is just a unit of weight masquerading as a unit of value. A unit of weight can not define a unit of value, any more than a unit of value can define a unit of weight. A unit of value must itself equal the general purchasing power for which the dollar is designed to serve as a measure. Some people imagine that a dollar is stable because they say a dollar is the gold standard and the price of gold does not vary. And it is true that the price of gold does not vary. The price is $20.67 an ounce and does not vary a cent.

And so people looking at that are constrained to the opinion that gold is a stable standard of value. I remember before the war talking with my dentist in New Haven in regard to the cost of living, and just to pass the time of day, I suppose, I asked if he was suffering from the high cost of living. He said: "Most assuredly." "Has it affected the price of all your tools and materials," I asked? "Yes," he said. I said, "Gold for instance," thinking that it was perpetrating a rather harmless joke. He said, "I don't know, but I will look it up," and he called the clerk in the next room; and when she returned with surprise on her face, she said, "Doctor, the price of gold is almost the same as forty years ago when you entered business." He remarked that gold must be a very stable commodity. It didn't surprise me, though! I said, "It is just as surprising that a quart of milk is always worth two pints of milk." He said, "I don't get you." "What is a dollar," I asked? He said, "I don't know." I said, "That's the trouble." Most people do not realize what a dollar is. A dollar is about one-twentieth of an ounce of gold. Under our system of free coinage, we take an ounce of gold to the mint, they cut it in two, each half is made into a ten dollar gold piece and handed back to you, and, naturally, you can always get back the gold that you give, and the mere fact that it is stamped does not add anything to its value. It is merely a certification of its weight. The dollar being one-twentieth of an ounce. naturally an ounce will always be twenty dollars. If we really need to measure the dollar, we should measure it in terms of commodities in general, and we find that it is constantly changing, as the index number proves.

Then we are asked, "Are you going to fix all prices?" "No; we are not going to do anything that we don't do today." We fix the price of gold today. My proposal—and this is one of several to solve this problem; perhaps some other is better—my proposal for stabilizing the dollar is to continue to fix the price of gold, but to fix it scientifically. The price of gold being $20.67 an ounce is only another expression for the weight of the dollar as $\frac{1}{20.62}$ of an ounce. If the weight of a dollar is one-fortieth of an ounce, an ounce of gold would be worth $40. One is reciprocal of the other. My proposal is that we fix the price not arbitrarily as we did in 1837, and keep it there ever afterwards, but to fix it and refix it as ought to be done.

Now, the very fact that gold does not change in price takes its revenge on the prices of other things. Since we can't mark gold down when it goes down, we have to mark everything else up. My proposal is that when gold goes down we should mark it down. We are not endeavoring to do anything now except to use a new figure. We fix the price of gold and we let supply and demand determine everything else. So this proposal by which we keep the general level of prices does not fix any level of prices, any more than the fixity of the ocean level means that the waves can't go up and down.

We now have a gold dollar fixed in weight, and therefore variable in value. What we want is a gold dollar fixed in value and therefore variable in weight. That is all there is to it.

Now, people say you can't change price levels just by changing the weight of a gold dollar. What kind of a dollar has Mexico? Mexico has a dollar weighing half as much as our dollar, and its price level is twice as high. You can exchange one American dollar for two Mexican, and *vice versa.* Why is it? Has that nothing to do with the weight of a dollar? Let me ask you: What would happen if Mexico, following the example of Canada, as it some day may do, should change its dollar, put two of them together and make it the same weight as ours; make it like the American dollar? Do you believe you would have to pay the same number of dollars for a pair of shoes in Mexico as now? Naturally, you would have to pay half as many dollars as you do now. The price level would be cut in two. Suppose we should get the foolish idea of adopting the Mexican dollar! What would happen? Prices would be immediately doubled in terms of this smaller dollar. Well, if that is true, if the adoption by Mexico of an American dollar would lower the price level and the adoption by the United States of a Mexican dollar would raise the price level, then isn't it clear that we have the price level in the hollow of our hand? We can boost it as we did during the war; we can lower it, or we can keep it stable; and of these three things it is the last that we ought to do, and to do it is very simple. We simply change the price of gold or the weight of the dollar just enough to maintain the same purchasing power. If we take the price level of today and try to keep that as an index number, and we find that next month the price level is 101—in other words that the dollar has depreciated about one per cent—then we try to remedy that by raising the weight of the dollar one per cent by lowering the price of gold inversely one per cent.

And if you ask me how I know that the remedy will be exact, I say I don't know; but it will tend in the right direction, because as you will admit from the Mexican example, the increase in the weight of a dollar will restrain the price level from rising. Now, if a charge of one per cent is not *exactly* enough to bring back the price level to par, we shall know it next month when we take the index number again, and if it is still 101, then that will be the authorization for another one per cent added to the weight of a dollar. And if on the following month it is still one per cent above par, we add another one per cent. And so on as long as it stubbornly stays up month after month; every time we take the index number we will load the dollar until it weighs an ounce or a ton, and the price level will sink back to par. If it goes below par, we shall see it at the next month, and so at periods of one or two months apart we shall find from that what we ought to do, and constantly change the weight of the dollar, just as we try to correct the error in the steering of an automobile. It is only after we see it out of its course that we correct it, and I have no doubt that by this system combined with a sane banking system we can keep it within one or two per cent of level all the time. Instead of fluctuating, it will remain at 100, 101, 100½, 99, 98½, and so on, very seldom departing more than one per cent from the ideal level.

Now, if it is true that business is staggering today because the dollar is staggering, if it is true that the dollar has all these evils in it, then it is worth the effort of every efficiency engineer to take part in the movement to stabilize the dollar.

An organization to promote the idea of the stabilized dollar is about to be formed. Some bankers have made a careful study of the subject and their conclusion is that they don't want to agitate for a stabilized dollar just now. But this is just the time to agitate the subject. If we take a standpat attitude and sit on the safety valve, we shall pay the usual penalty. If the unstabilized dollar is responsible for the present discontent, the mere discussion of the evil we are suffering from, the mere pointing out to labor that it is not the fault, for instance, of the Taylor system, the pointing out that these evils exist owing to the fault of the unstabilized dollar, will of itself help to allay discontent.

So I vigorously disagree that the project should not be started now. I have a list of twenty-four of the leading bankers in the United States who want